THE IRON TRADE REVIEW

VOLUME XXIX. CLEVELAND, O. JUNE 25, 1896. CHICAGO, ILL. NUMBER 26.

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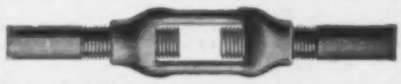

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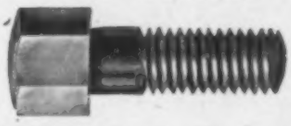

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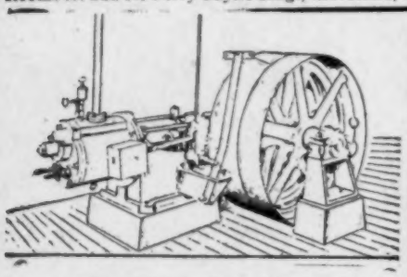

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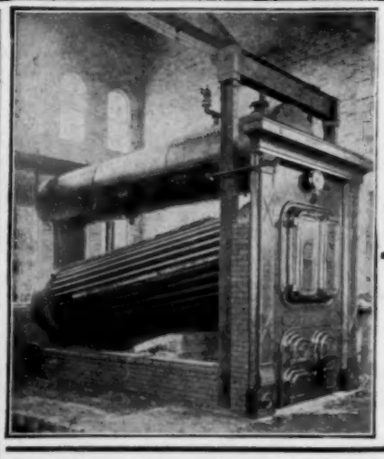

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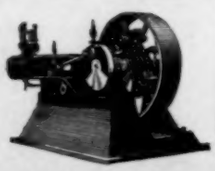

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THE IRON TRADE REVIEW

VOLUME XXIX. CLEVELAND, O. JUNE 25, 1896. CHICAGO, ILL. NUMBER 26.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The last week of the half year gives indications that a season of idleness is ahead for union mills, and it is evident that the pig iron market would be the gainer meantime, if there were a further curtailment of blast furnace operations. The sentiment among the members of the Merchant Bar Iron Association seems unanimous against an advance to $4.50 for puddling, and it is hardly to be expected that to-day's conference at Youngstown will bring a withdrawal of the men's demand. Beyond the activity incident to the approach of the summer shut-downs, the situation has yielded little in the past week that gives evidence of an expanding demand. There is more inquiry for foundry irons and buyers in the habit of covering at this time for a half year's supply have been sounding the market. From 25 to 75 cents below the nominal basis of the past month represents the range of prices on late transactions, and the agreed basis of five Southern concerns no longer governs. Two of them have business booked for the next three months and are not aggressive. As long as general buying lags, the occasional order, involving a fair tonnage is taken at a low figure. Buyers concede that an advance is entirely probable later in the year, but what amount of business is required to correct present weakness and irregularity, and whether still further weakness will precede the advance, are uppermost questions. In Bessemer iron the chief feature is the inquiry for 60,000 tons for an Indiana steel works. Some low prices have been named from the valleys, but the Chicago district is likely to take the business. Only a few thousand tons has been actually closed thus far. In rail buying, a B. & O. requisition for 24,000 tons has been placed, 16,000 tons going to Pittsburg, and the balance to Western Pennsylvania and Chicago. It is too early, perhaps, to look for any response in actual buying, to the sound money declaration made at St. Louis, but there is no lack of confidence that it will be heard from in this way. The outlook for Bessemer steel consumption in the third quarter of the year is far from satisfactory. Tin plate mills will be shut down for a portion of the quarter, at least, and bar mills that have been buyers of billets, will push their trade in iron and use as little steel as possible. The demand for steel on wire nail account will be kept restricted. At its Chicago meeting, the pool decided to continue the guarantee on prices through July and to maintain the present basis. The arrangements with two outside interests by which they will no longer compete with the pool were completed. They are not made members of the pool but will be paid a price in lieu of output. The Central Traffic Association has renewed its recommendation to the traffic managers that a 40-cent reduction be made on pig iron from the valleys to Chicago and New York, and with a change in the classification of old material so that pig iron alone will have so large a reduction, it is believed the recommendation will not be rejected this time.

THE CLEVELAND DISTRICT.

The shortening of the May rate of ore shipments is reflected in the present weak freight market, and the smaller movement of grain and coal is also in evidence. Wild charters from the head of the lake have been made at 80 cents this week and Escanaba tonnage is 50 cents. Little has been done from Marquette, but 70 cents is as much as could be obtained at present. Vesselmen and shippers agree that a weak market will probably prevail for the next 60 days. There are no indications that ore-buying will be resumed on any liberal scale for some weeks to come, though meantime there is a small-lot trade both in Bessemer and non-Bessemer ores. In adtion to the carrying over to this year of portions of contracts unfulfilled because of high freights, and postponed to 1896 by agreement, there has been some filling of 1895 balances whose delivery was prevented by strikes. The condition accompanying these transactions has been that the buyer take a stipulated amount of 1896 ore at this year's price. In this way some stimulus has been given to a lagging market. At this time last year, ore prices were advancing all around and the summer months witnessed an activity of which there is no promise for 1896, at least not until fall.

Pig Iron. An inquiry for 60,000 tons of Bessemer iron caused some stir in the valleys the past week, and some low quotations were made, but as the destination is Indianapolis, the Chicago district has the advantage. One lot of 5,000 tons is reported sold for delivery in the valley. The accumulations of Bessemer iron in the valley before the general furnace stoppage have led to some very low bids, but consumers find furnacemen in no mood to accept offers of $11.25 and $11.50, such as were made the past week for delivery in the third quarter. A few foundries are making inquiries, but there is little disposition to make extended contracts. We note a few sales of 100 and 200 tons, with prices generally lower than in May. In gray forge very little has been done. A recent small sale of Southern was at $10, delivered in the valley. Cleveland quotations follow:

Bessemer	$12 40@12 60	Valley Scotch No. 1	$12 75
No. 1 Strong Foundry	12 25@12 50	Valley Scotch No. 2	11 75@12 25
No. 2 Strong Foundry	11 50@11 75	Gray Forge	10 50@10 75
No. 3 Foundry	11 00@11 25	Lake Superior charcoal	13 50

Finished Material. The local market for plates, sheets, structural shapes and bars is monotonously quiet. An inquiry for vessel plates from Buffalo is the only considerable item, and it is not certain that this will develop into early business. The shutting down of bar and sheet mills for some weeks is now predicted. We quote beams and channels, 1.65c; tank plates 1.30c to 1.35c; angles, 1.30c; bar iron, 1.20c; steel bars, 1.15c to 1.20c. There is more pressure to sell old material, but buyers are doing little. We quote old iron rails at $15 to $15.50; busheling scrap, at $9 to $9.50; No. 1 wrought scrap at $11.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, June 24.

As a rule, dealers in iron and steel are disposed to feel considerable more confidence in the future since the St. Louis convention than before, but so far, at least, very little business has been had that can be called the result of the returning confidence among buyers. It is expected that the next few days will determine whether the St. Louis platform will stimulate buying, or whether there will be a further wait until after the Chicago convention. A good reason is always near at hand for any lack of interest buyers may show; and the average man is satisfied with the nearest reason. Pig iron men are looking for a large business in the next 60 days, and are confident that the larger part of the buyers in this territory will fill their requirements in that time. It is probable that a good share of the expected trade will materialize in a few weeks, but buyers have been putting off purchasing in large quantities so long they may decide to continue for some months longer the policy of meeting only their immediate wants. One of the most astute observers in this market said recently that he does not look for anything like a general revival in business before late in the fall.

PIG IRON.—Last week's business was hardly so large as that of the week before, but still a very fair trade was had. Two orders of 1,000 tons each, and one of 500, together with several for smaller amounts of Southern iron were received, and this nearly clears the market of anything like large inquiries. Nearly all the business being done is at prices from 25c to 75c under combination quotations, and by far the larger part of it is taken for furnaces outside of the pool. The three largest furnace companies claim to be maintaining the agreed prices, and, as already stated, they are getting very little of current business. Local furnaces are selling little, but look for a large increase within the next 60 or 90 days. Quotations are being maintained very firmly, rumors to the conntrary notwithstanding. Prices are much as follows:

Lake Sup. Charcoal	$13 50@14 00	Southern No. 2 Soft	$10 60@10 85
Local Coke Fdy. No. 1	11 75@12 00	South'n Silveries No. 1	11 85@12 35
Local Coke Fdy. No. 2	11 25@11 75	South'n Silveries No. 2	11 60@11 85
Local Coke Fdy. No. 3	11 00@11 25	Jackson Co. Silveries	14 50@16 00
Local Scotch Fdy. No. 1	11 75@12 00	Ohio Silveries No. 1	15 00@15 50
Local Scotch Fdy. No. 2	11 25@11 75	Ohio Silveries No. 2	14 50@15 00
Local Scotch Fdy. No. 3	11 00@11 25	Ohio Strong Softeners	15 00@15 50
South'n Coke No. 1	11 60@12 10	Alabama Car Wheel	16 85@17 35
South'n Coke No. 2	10 85@11 35	Malleable Bessemer	12 75@13 00
South'n Coke No. 3	10 60@10 85	Coke Bessemer	13 00@13 50
Southern No. 1 Soft	10 85@11 35		

BARS.—A better inquiry was had the first of the present week, but as yet no orders of any size have been placed, nor is the total tonnage closed much larger, if any, than a week ago. Very low prices are heard of on steel, but quotations are unchanged: Common iron, 1.30c to 1.35c; guaranteed, 1.35c to 1.40c; soft steel bars from strictly billet stock, 1.30c to 1.35c.

RAILS AND TRACK SUPPLIES.—A fair run of orders is had all the time, but no particularly large business is being done. Rails, $29; splice bars, 1.40c to 1.45c; track bolts with square nuts, 2.05c to 2.15c; hexagon nuts, 2.15c to 2.25c; spikes, 1.80c to 1.85c.

BILLETS AND RODS.—The local mills report the market very quiet and no business closed. Billets are still quoted at $21.25, and no quotations are made on rods.

STRUCTURAL MATERIAL.—A little business in bridge shapes is had from railroads, but aside from this the market is very quiet. Prices are weaker, as follows: Beams and channels, 1.70c to 1.75c; angles, 1.40c to 1.45c; plates, 1.45c to 1.50c; tees, 1.65c to 1.70c. Small lots from stock are quoted ¼c to ½c higher.

PLATES.—No large transactions and only a few small ones have taken place in the week. The inquiry is light and business is not expected to improve immediately. Prices are weak, and are a little lower on tank plates. Tank steel, 1.45c to 1.50c; flange steel, 1.70c to 1.75c; fire-box steel 2.35c to 5c; boiler tubes, 70 to 75 per cent discount.

SHEETS.—Little was done last week, and the inquiry is not improving as yet. Quotations are weak, and are made at 2.30c to 2.35c for No. 27 black sheets, and 75 and 10 and 5 to 80 per cent discount for galvanized.

MERCHANT STEEL.—General business is quiet, and the few season's contracts that are being placed are of small tonnage. Quotations are made as follows: Open-hearth spring, tire and machinery steel, 1.85c to 1.95c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire 1.55c to 1.65c; tool steel, 5 50c to 7.50c; specials, 11c and upwards.

OLD RAILS AND WHEELS.—The market is very dull, and only a few small sales were made last week. Prices are nominally as follows: Old wheels, $12.00 to $12.50; old iron rails, $13 to $13.50; old steel rails, $9.00 to $10.

SCRAP.—The market is lifeless, and dealers do not expect any considerable increase in sales at once. The following are buying quotations furnished by dealers: Railroad forge, $11.50 to $12; dealers' forge, $10 to $10.50; No. 1 mill, $8; heavy cast, gross ton, $9 to $9.50; malleable cast, $9.50 to $10; axles, $15; cast borings, $4.25; wrought turnings, $5.25; axle turnings, $6.50; mixed steel, $7.75; stove plates, $7; heavy melting steel, $9 to $9.50.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, June 24.

While the local iron market is substantially as it was a week ago, reports of transactions, actual and prospective, are to the minds of many forerunners of better buying just ahead. A valley purchase of 5,000 tons of Bessemer is reported at $11.65 at furnace, deliveries to Nov. 1. In the billet market, while buying is but little enlarged, there is a better feeling, since, practically, everything is on the pool basis. A 24,000-ton rail order, and inquiries for 60,000 tons of Bessemer iron, and for 3,500 tons of bars are features of the week.

PIG IRON.—One of the large plants in the Mahoning valley, in spite of rumors of a shut-down, is said to have bought a quantity of Bessemer iron for later deliveries, in the last few days. Added to this is an inquiry for 60,000 tons of Bessemer for the steel works at Indianapolis, which begin operations July 1. The general run of buying is limited, as for weeks past, and quite a number of shut-downs are in prospect. Prices have not changed perceptibly, and remain as quoted below. Foundry irons are a trifle more active, with unchanged quotations. A sale of 2,000 tons of No. 2 is reported at $12, for delivery in the third quarter. We quote:

Bessemer	$12.40 to $12.60
No. 1 Foundry	12.25 to 12.50
No. 2 Foundry	11.75 to 12.00
Gray Forge	10.60 to 10.75

BILLETS AND RODS.—Several sales of billets at pool rates are announced for the week, though none of any considerable size. What is believed to be the last of middlemen's steel is being disposed of at about $20. A few sales of this character are reported. Rumors of a reduction in the pool price do not find any confirmation, and more business is expected soon at established rates. Rods are nominally $25.50, but there are no transactions. Some little business is reported in sheet bars.

STRUCTURAL MATERIAL.—There is only a moderate business going, and it is all of the small lot order. We quote beams and channels, 1.55c; angles, 1.20c to 1.25c; universal plates, 1.30c; tees, 1.35c.

RAILS.—The B. & O. road is understood to have bought largely of rails during the week—the total tonnage being 24,000 tons. Of this the local rail mill is said to have taken 16,000 tons, and this order is now being turned out.

PLATES.—The plate market is still weak, and low prices are occasionally forced by eagerness for business. The tonnage taken in the week includes no orders of any size, but is the aggregate of smaller sales. Prices are held: Tank, 1.25c to 1.30c; shell, 1.35c. to 1.45c.; flange, 1.50c to 1.55c. An inquiry for 1,700 tons of vessel plates has been received.

SHEETS.—The sheet output for June will be somewhat larger than that for May, and some mills are now running in part, at least, that were idle last month. The wage conference of Friday will be watched with interest, as a general shut-down may result, which in some cases would cause inconvenience. Two inquiries for sheets, 450 tons and 375 tons, have been figured on in the past few days and the former lot was placed through a Pittsburg firm. Quotations are unchanged: No. 26, 2c; No. 27, 2.10c; No. 28, 2.20c.

BARS.—Railroad buying continues fairly active and bars have shared in the movement. A Western inquiry for 3,500 tons has come into this market, and smaller ones are also reported. All interest naturally centers in the conferences on the puddling scale, that with Pittsburg manufacturers on Wednesday, and that with Western rolling mills at Youngstown on Thursday. We quote steel bars at 1.10c to 1.15c; all muck bar iron, 1.20c to 1.25c; common, 1.10c to 1.15c, with Youngstown and Cleveland prices held at 1.20c.

WROUGHT PIPE.—The pipe market is at a very low ebb, and there are reports of an early shutting down of some of the larger mills. Certain departments are now idle. Quotations are not given, as none are asked.

OLD MATERIAL.—The scrap market is still lifeless and prices are merely nominal. We quote: No. 1 wrought scrap, $11; cast scrap, $10; old iron rails, $15; old steel rails, $12 to $12.50; rolled iron axles, $17; hammered iron axles, $17 (net); car wheels, $11 and $11.50; coil springs, $13.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Philadelphia. The small lot trade in pig iron seems somewhat larger, and it is being carried on under concessions by holders, who would make sure of keeping their trade. There are evidences that business for this half year is being wound up. Many large mills will be closed in the first week or 10 days of July, and some may remain idle throughout the month. Mill buyers of iron and billets are naturally very conservative, and there is very little disposition to contract for the latter part of the year or even for the third quarter. Rolling mills in Eastern and Central Pennsylvania have complained of dullness for some time; yet there is a hopeful view of the chances for business in the second half of the year. Weakness and irregularity have marked prices made on recent business. Some small lots of billets have been taken at $21.50, the pool price, but even with the price guaranteed transactions are only for limited amounts. Old material, outside of some call for old steel rails at $13.25, for shipment to interior points, and for heavy melting scrap at $13 to $13.75, is in light demand. Old iron rails are quoted $14 to $14.50; No. 1 wrought scrap, $13 to $13.50. We quote pig iron: No. 1 X foundry, $12.50 to $12.75; No. 2 X foundry, $11.75 to $12.25 lake ore irons about 25c above these prices; No. 2 plain, $11.25 to $11.50; gray forge, $10.75 to $11. On plates we quote 1.40c to 1.45c for tank steel; beams and channels, 1.70c to 1.75c; angles, 1.40c to 1.50c; common bar iron, 1.20c to 1.25c; steel bars, 1.20c to 1.30c.

Cincinnati. The business of the week has been irregular. A few buyers, feeling that current prices are safe for scattered future deliveries have bought quite liberally, and were the demand in sight for their output very many would place large orders for pig iron. There has been a good run of small orders throughout the week. The condition of the grain, hay, potato and fruit crops warrant the expectation of good returns to the farmers. The railroads have decided apparently with unusual unanimity to maintain existing freight tariffs, which if adhered to give assurance of their improved abilities to purchase needed equipment and betterments. July is the usual purchasing period for many consumers that buy semi-annually. Some of these are entering the market now somewhat earlier than usual, believing that the present is a good time to contract. The inquiries are rather more numerous and for larger quantities than for some two months past. Though the market is in a somewhat unsettled condition, the following pig iron prices are quoted: Southern coke foundry No. 1, $10.50 to $10.75; No. 2, $10 to $10.25; No. 1 soft, $10 to $10.25; gray forge, $9.25 to $9.50; Tennessee charcoal No. 1, $13 to $14; Lake Superior charcoal, $15. In finished material, there is some buying for mid-summer needs, but in small lots. Sheet mills find only fair demand on roofing account and for forward contracts in any line of mill products are unknown.

Buffalo. The pig iron market, as seen from this standpoint, remains quiet and uneventful. The waiting feeling continues to predominate, and it remains to be seen whether the generally expected clearing of the political skies will have the looked for stimulating effect. Certain it is that enough business has been and is still being put off and held back to warrant all in expecting an unusual amount to be crowded into the remaining months of the year, providing pending public questions are quickly settled to the satisfaction of the majority of the business men throughout the country. We continue previous quotations: No. 1 strong foundry, lake ores, $13 to $13.25; No. 2 strong foundry, $12.50 to $12.75; Ohio strong softener No. 1, $13 to $13.50; Southern soft No. 1, $12.40; No. 2, $11.90; Lake Superior charcoal, $13 50 to $14.

Personal.

Wm. P. Palmer, recently assistant to the president of the Carnegie Steel Co., was elected second vice president of the Illinois Steel Co. at the meeting of its board of directors held in Boston last week.

Noah W. Gray, who has been manager of the Ashland Iron & Steel Co. for several years has resigned. W. H. Hinkle, of Minneapolis, secretary of the company, will succeed him as manager.

Richard A. Parker, mining engineer, formerly of Marquette, Mich., who has been engaged in professional work as superintendent of the Great Simmer & Jack mine, in the Transvaal, for some time, arrived in New York last week, en route to fulfill engagements in California and later to visit the new mining fields of British Columbia.

W. D. Rees, president of the Republic Iron Co. and treasurer of the Lake Superior Iron Co., will be absent in the East the coming month. At Boston he will attend the annual meeting of the Lake Superior Iron Co. held this week.

THE IRON TRADE REVIEW

DEVOTED TO IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES.

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THE MARCH OF OPEN-HEARTH STEEL.

The publication of the official statistics of Bessemer and open-hearth steel production in Great Britain in 1895 furnishes an interesting study, taken in connection with the figures for other years. The conspicuous fact in the record is that for the first time in the history of the steel trade the open-hearth output of Great Britain exceeds that of Bessemer steel. Going back 15 years, the Bessemer product in Great Britain was 1,044,382; it reached its height in 1889 at 2,140,791 tons, and since that time has been considerably less, with some fluctuations. Open hearth steel, which had an output of 251,000 tons in 1880, rose steadily. In the years preceding 1895 it varied somewhat; but since 1892 it has shown a steady gain, and last year reached its climax at 1,724,737 tons, against 1,535,325 tons of Bessemer.

The changes in the six years beginning with 1890, both in the United States and Great Britain, are indicated in the following table, which gives also, as a basis of measuring the notable advance of steel production in 15 years, the output for 1880:

PRODUCTION OF OPEN HEARTH STEEL IN UNITED STATES AND GREAT BRITAIN—GROSS TONS.

	United States.		United Kingdom.	
	Bessemer	Open Hearth	Bessemer	Open Hearth
1890	3,688,570	513 232	2,014,843	1,564,200
1891	3,247,417	579,753	1,642,005	1,514,538
1892	4,168,435	669,889	1,500,810	1,418,830
1893	3,215,686	737,890	1,493,454	1,456,309
1894	3,571,313	784,936	1,535,384	1,575,318
1895	4,909,128	1,137,182	1,535,225	1,724,727
1880	1,074 261	100,851	1,044,382	251,000

From 1,175,112 gross tons in 1880, the total output of steel in the United States by the two processes grew to 6,046,310 tons in 1895, an increase of 415 per cent. In Great Britain the total output last year was 3,259,962 tons, against 1,295,000 in 1880, an increase of but 152 per cent, the climax there being reached about 1890, when the total of Bessemer and open-hearth was 3,579,043 tons.

It is altogether probable, in view of the strides the open-hearth process is making in both countries, and the increasing specification of its product in vessel, bridge and architectural work, that 1895 will prove to be the high water mark for the Bessemer percentage of the total. The increase in the annual capacity of open-hearth plants in this country from 1,740,000 gross tons at the beginning of 1894 to 2,430,450 tons at the beginning of the present year is to be attributed in large part to the expansion in basic steel; and in the past few months a considerable addition has been made to the number of basic plants projected or under way. The movement on this side is the reverse of that in Great Britain, where basic open-hearth steel declined from 503,400 tons in 1890 to 159,869 last year, 1,564,868 tons being acid open-hearth.

The significance of this movement to owners of non-Bessemer iron mines, to the interest involved in the handling of old material, and on the other hand to the producers of Bessemer ores, whose phosphorus is uncomfortably close to the limit, needs not to be enlarged upon. Moreover, should there be a disposition on the part of the Bessemer steel pool to advance prices unduly, of which there has been no indication thus far, basic open-hearth steel, as present practice is demonstrating, can be manufactured at a cost that will make it a very effective balance-wheel.

MACHINERY BUYER AND SALESMAN.

Perhaps I may as well begin at the back end, same as Proudhon did, and say at once that I sometimes go on the road selling, or perhaps more properly just at this time, trying to sell, machinery; improved machinery, of course. I make this confession because this is written from the standpoint of the traveling man (I have expressed myself in this paper heretofore from the standpoint of a man on whom the traveling man calls, which position I occupy when at home).

There is one place where I go occasionally that is a sample of many more places. I always ask to see the master mechanic of the place, and as regularly get a refusal, together with some very pointed information that they "don't want any machinery." The refusal and the information always come from the manager of the concern, to whom I am always referred when I ask to see the master mechanic.

It seems to me that this manager does not allow the master mechanic to earn his salary. I think the business of a master mechanic, among other things, is to know about the "state of the art" in the matter of machinery, and even if the concern "don't want any machinery" at the present time, it would be a good thing for it to give the master mechanic every opportunity to keep posted. This particular manager "buys all the machinery himself" but it does not follow that he knows what kind of machinery is the best for his purpose. The chances are that he doesn't know anything about machinery, anyhow, and if the master mechanic isn't the kind of a man that he can trust me to see and explain my machinery to, it seems to me it would be a good thing for him to discharge the master mechanic and get a better one.

It further seems to me that it is a matter of good business policy to treat any traveling man who comes to the office, in a decent manner, provided, of course, that he behaves like a gentleman. Leaving the sentiment out of the case, a traveling man has many opportunities to help or hinder. I recall a case in which a very modest and unimportant traveling man diverted a $6,000 order for machinery from one concern whose manager had snubbed him on various occasions, to another concern whose manager had always used him well. I know this to be true, because it was I who did it. Not a very nice thing to do, you say? Perhaps not; but I am only trying to give you the benefit of my experience.

SCRUTATOR.

POINTS FROM CORRESPONDENTS.

Export Shipments of Southern Iron.

TO THE EDITOR:

Referring to the article, "Southern Iron Shipments to Italy," in your issue of June 18, we cannot agree with the view expressed that this business is "tentative and experimental." The 500-ton lot of Alabama iron for Genoa, to which your article refers, was sold to us, and, speaking from knowledge of the situation, exports of Southern pig iron should regularly continue, except during temporary periods of prohibitory ocean freight rates. ENNIS & Co.

PHILADELPHIA, June 20.

Protection and Sound Money at St. Louis.

TO THE EDITOR:

In your editorial on the "The Political Campaign and Business" you seem to be at a loss to know why protection, which you regard as the main issue, was lost in the shuffle at St. Louis and the gold plank given first place. To explain this it is only necessary to review the history of the immediate past, with which you are entirely familiar, but of which you seem to be unable to realize the importance.

Since the repeal of the "Silver Purchase Act" the silver men in Congress have been "forninst" the present administration and have acted the part of chronic obstructionists, in some cases spoiling and in others defeating entirely what might have been fairly good legislation. This fact has been so apparent that it is really a wonder that its importance was not appreciated by more people.

If McKinley stands for anything, he stands for protection and his election would mean a victory for the protective principle, whether it was mentioned in the platform or not. It is possible to hold a single object so close to the eye as to obscure one's view of everything else and this is exactly McKinley's position as regards the money question. There is no doubt as to how he stands on the tariff, but as between gold and silver he has been somewhat hazy, to say the least. His election without a perfectly definite meaning in terms of gold and silver would simply renew the obstruction carried on in the past as soon as a revision of the tariff was attempted. Therefore, while "McKinley and Protection" was good enough to carry State and district conventions, yet in the larger arena of National politics it was necessary to plant his feet on a firmer foundation, to enable him, if elected, to enact "protection and good times" into fact. In other words, it was necessary to compel the silver men to stand up and be counted at the polls, and either silence a noisy minority in Congress, or, if they possess sufficient strength, turn over the control of affairs to them, together with the attendant responsibilities.

Mr. McKinley and his managers did not possess the courage to do this, but others did, and, therefore, if successful, his election will mean not only an approval of the principle that he stands for as an individual, but should carry with it the power to make this principle an effective piece of legislation.

HARRY J. LEWIS.

PITTSBURG, June 20.

THE Lodge & Shipley Machine Tool Co., Cincinnati, has recently increased its producing capacity about 50 per cent. by installing about $10,000 worth of new machine tools, occupying double the floor space used heretofore. The company has a very satisfactory number of orders ahead for future delivery.

THE Semet-Solvay retort ovens at the plant of the Dunbar Furnace Co., Dunbar, Pa., will not be in complete running shape until the latter part of July. Due notice will be given when they are ready for inspection. There has been a very general interest among furnacemen and others in the progress of the work.

GEO. H. HULL, president of the American Pig Iron Storage Warrant Co., and R. M. Atwater, of the Semet-Solvay Co. Syracuse, N. Y., have been Cleveland visitors in the past week.

MANY SHUT-DOWNS OVER WAGES.

The meeting of sheet manufacturers and the Amalgamated Association committee at Pittsburg last week adjourned with no settlement of the scale in sight and both sides apparently immovable. The point of contention is the proposed reductions, averaging about 10 per cent. on steel sheets, in the wages of rollers, heaters and shearmen. The manufacturers object to paying the same price for working iron and steel. The present system, they urge, is out of joint with market conditions, particularly in view of the advance in the cost of steel. The men insist that the condition of the market for sheets is due to the lack of harmony among manufacturers. They ask for the present scale and for certain changes in foot notes which will net some of the workers more money. The conference adjourned to meet again on Friday of this week.

The tin plate scale promises to be stubbornly contested on both sides. At the Pittsburg meeting of June 11 the manufacturers took steps looking to a united stand to secure reductions in wages and an agreement with money forfeit was provided for to maintain a shut-down should it become necessary. On rollers' wages a reduction of 18 per cent is desired by the manufacturers and a somewhat smaller reduction on doublers' wages. At the same meeting resolutions were adopted looking to an affiliation with the National Hardware Jobbers' Association and the maintenance of a fixed difference between the price to jobbers and to retailers. Arrangements were made also for the continuance of the gentlemen's agreement as to prices, with some additional provisions to insure adherence to it. A further meeting of the association is to be held this week. There are a few non-union mills that have not agreed to remain idle and the probable extent of the shut down can not be known as yet.

The bar iron scale was discussed at Pittsburg Wednesday by a committee of the Amalgamated Association and by A. E. W. Painter, Alex. Laughlin and James M. Bailey, representing iron manufacturers. The $4.50 rate for puddling was refused by the manufacturers. Further conference was postponed pending the meeting at Youngstown, Thursday, to discuss the same scale.

The indications are that not a single scale will be adjusted by the opening of July, and only the developments in that month can determine the length of the shut-down.

Lake Superior Iron Mines.

The Republic Iron Co's third dividend of $1 a share in the present fiscal year was declared this month. In the preceding fiscal year $2 a share was paid, so that $5 a share has been paid in dividends since Dec. 1, 1894. Yet a number of sales of the stock were made in 1893 and 1894 at $8 a share and even lower. Republic stock has changed hands in the past two months at $18 and $20 a share.

The Duluth Iron Mining Co. is reported to have given an option on all its property on the Mesabi range, taking in 12,000 acres of fee lands.

The Pittsburg & Lake Angeline Iron Co. held its annual meeting June 24, and elected the following directors for the ensuing year: James Laughlin, Jr., John W. Chalfant, George M. Laughlin, B. F. Jones, Jr., William G. Mather, W. G. Pollock, D. C. Phillips, E. R. Perkins and Alfred Kidder. The board of directors elected the following officers: President, James Laughlin, Jr.; vice president, John W. Chalfant; secretary and treasurer, W. G. Pollock; mine agent, A. Kidder.

The Lowmore mine at Mountain Iron has been leased by C. M. Palmer, of Duluth, and G. H. Long, of Minneapolis, to Geo. A. St. Clair and others. Mr. St. Clair will be general manager. The name has been changed to Ætna.

The Vega mine at Eveleth, Minn., closed down last week pending a change in control. Cleveland parties are the new owners. The ore was popular in 1895, the first year of any considerable shipment.

THE Berlin Iron Bridge Co., of East Berlin, Conn., has secured a contract for a steel rolling mill building, 103 feet wide and 112 feet long, from the Pennsylvania Bolt & Nut Co., of Lebanon, Pa. The building will have a steel frame, and roof and sides will be corrugated iron.

THOS. LYNCH, general manager of the H. C. Frick Coke Co., has gone on a three months' European trip.

BURSTING OF A ROD MILL FLY-WHEEL.

BY HOWARD P. FAIRFIELD.

Just before midnight, June 15, 1896, a large fly-wheel, running at the American Wire Co.'s works, Cleveland, burst, wrecking the engine, tearing a large hole in the roof and demolishing the walls of the engine room. The writer was notified the next forenoon, and spent several hours at the works of the company taking measurements, getting views with a hand camera, talking over the accident with the employes, and examining all the fragments that were to be found.

There are two large Harris-Corliss engines standing at right angles to each other, and each driving a set of continuous rolls in the company's rod mill. The wrecked engine of these two has a 28-inch diameter by 60-inch stroke cylinder, and ran at a normal speed of 74 revolutions per minute. It was geared direct to the set of rolls it drove, and the load varied from friction load to full load in fifteen seconds.

The wrecked wheel was a cast iron one, built up of several sections, and was 24 feet in diameter, and 48 inches across its face.

The arms, as will be seen from Fig. 1, were held by two large flanges at the hub, and the rim sections were held together by heavy bolts. The mate to this wheel just shows an edge of its rim in the background of Fig. 2.

The wrecked wheel was broken into a great many fragments, the largest of these seen by the writer being 900 pounds, estimated weight. This is probably very close to the weight as the estimation was made by employes of the company, that handled large quantities of iron every day.

The arms, with one exception, are broken off close to the flanges, as shown in Fig. 1, and also close to the rim. One entire arm was left on the hub, and in perfect condition. The greater part of the rim was thrown outside the building, and through a hole made by itself in the roof. This hole was at no place at a greater angle than 45 degrees from a vertical through the hub.

Some of these fragments were found 640 feet, by tape line measurement, from the shaft of the wrecked engine. The two farthest away, so far as found the next day, weighing 900 pounds apiece. As one of these was in the lake, there may be others still farther away than these, the water being too muddy to see the bottom. A fragment weighing about 600 pounds went back by the cylinder, just clearing the belt and fly-wheel of engine No. 2, burst through a brick wall, and finally dropped on the floor in front of a workman in the machine room. The hole made in the wall is clearly seen in view No. 2. If this had hit and wrecked the fly-wheel of engine No. 2, it would most certainly have increased the damage very much, as a large battery of boilers under a high pressure was in direct line with, and close to this wheel.

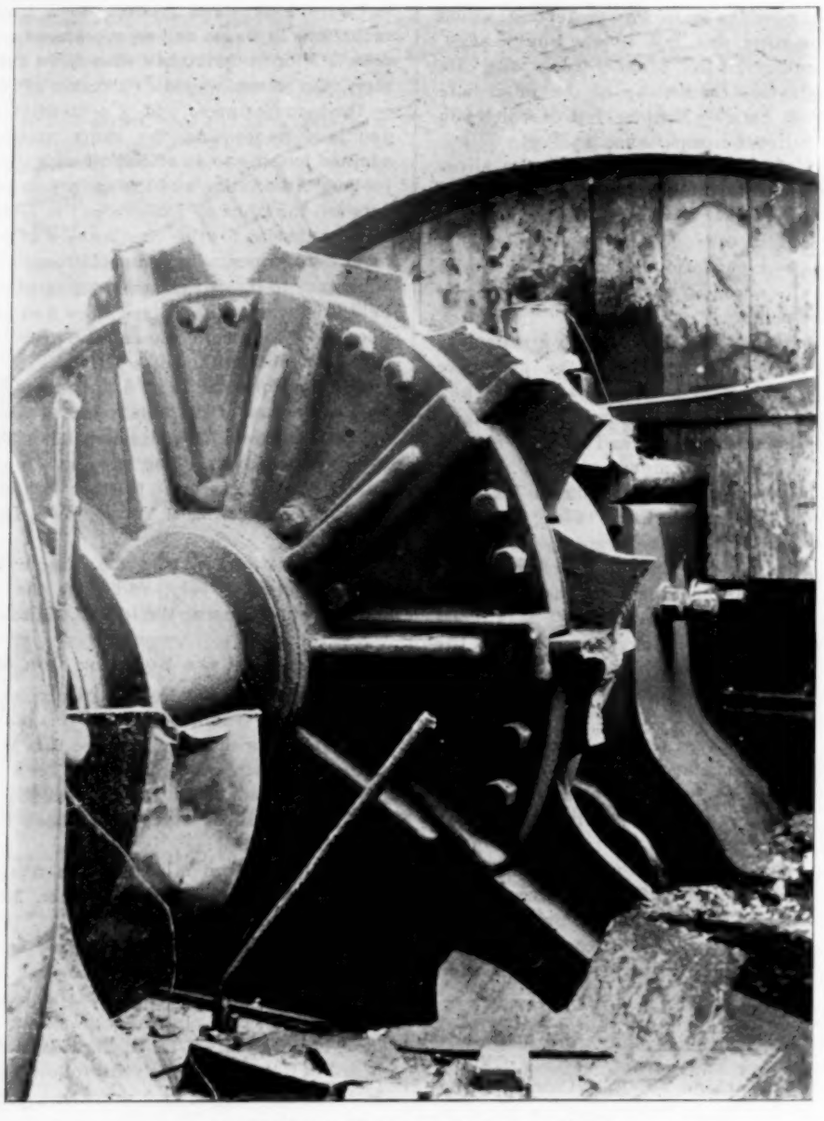


FIG. 1.—SHOWING HUB OF WRECKED FLY-WHEEL.

The wrecked engine is set on a very massive brick foundation, extending at least ten feet below the floor line. The legs or pedestals of the engine were broken, and the whole foundation would seem to have moved back and forth, as the exhaust pipe was pulled from its connection. The wheel must have been running at a great excess from its normal speed, as an examination of the fragments showed the metal to be very clean and sound, for cast iron, with only one exception, so far as noticed. The arm left intact with the hub had a piece of rim left on it that showed quite bad blow holes, and it would seem that the first giving way might have been here.

From inquiries made, it would seem that even under the best of conditions, the engine was over loaded before the billet

passed entirely through its set of rolls, and if for any reason, the metal being rolled became cooled a little more than usual, the engine would slow down until the governor balls fell so low that the safety cams would act, thus shutting off steam and letting the engine stop entirely. To prevent this and insure carrying the billet through the rolls, the governor was so blocked as to prevent its going below a certain point. The belt that drives the governor either gave out of itself or was broken from some outside agency, the latter not probable in this case. This allowed the governor balls to drop to the block, thus opening the valves to their widest extent, causing the engine to race. The engineer started for the throttle, to shut off steam, but the pressure was so great that the wheel attained bursting speed before he could get to it.

The throttle being in direct line with the wheel, he would very likely have been killed had he reached it, as it takes six or eight turns to close it. The wrecked wheel had no belt running on it, and was doing duty as a balance wheel only. If the governor had been free to do what it was designed to do it is safe to say there would have been no accident. Only one man was injured, and he not seriously.

Case School of Applied Science,
Cleveland, June 22.

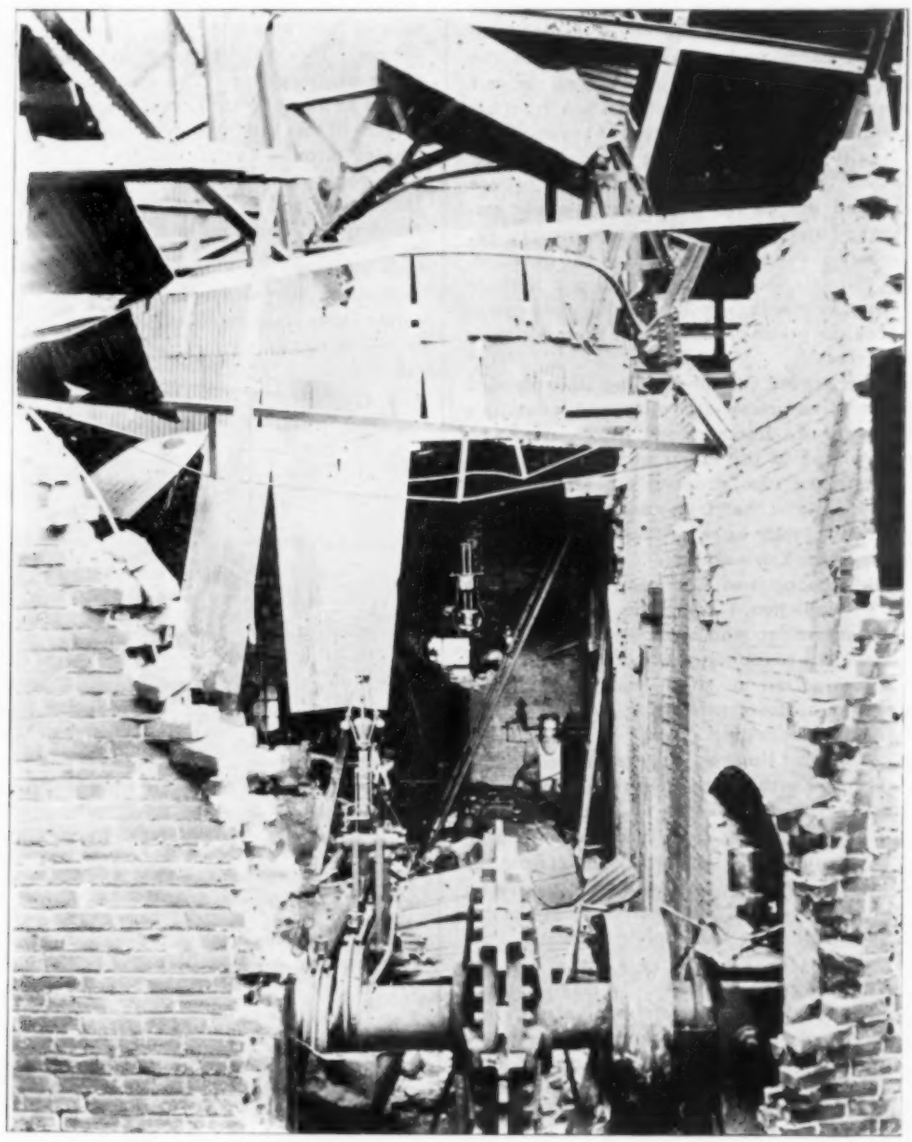


FIG. 2.—VIEW OF ENGINE ROOM.

Cast Iron and Bursting Fly-wheels.

The bursting of a fly-wheel is almost unheard of in England, notwithstanding the high speed engines we now have running; yet in the United States the fly-wheel casualties have become a matter of weekly report. In England we have many thousands of high-speed cast iron fly-wheels and very large wheels up to 60 tons weight running with very high periphery speed, and they all run safely, and yet in the states they say: "The sudden advent of electrical apparatus and its high speeds found people making fly-wheels of cast iron, with a narrow factor of safety, or, indeed, no factor of safety at all, if we consider the impossibility of detecting inherent strains and imperfections in this material. No one can know the value of material molded into form at a temperature of 2,000 degrees and then cooled down to a fortieth of this temperature nor can we judge internal structure by surface indications. The fact is that cast iron is not suitable material for fly-wheels that are to be driven at high speed, nor is it necessary to make them of this material. There is not even the claim of cheapness in their favor, if the methods of making such wheels of wrought iron and steel were once worked out. Twenty years ago a Scotch firm who had to make a large fly-wheel for a spinning mill, riveted up a box rim made from rolled plates, and filled it with cemented masonry or 'grout,' and did a very sensible thing."—[Engineer, London.

THE extensive repairs recently made on the Claire Furnace Sharpsville, Pa., make it one of the best in the valley districts. A new top has been built, explosion doors have been put on and a new down-comer built. A large automatic dust catcher new pumps and water boxes are among the improvements.

THE Beaver Falls mill of the Consolidated Steel & Wire Co. which has been shut down for the past 10 days starts again this week.

EMERGENCIES IN THE FOUNDRY.

BY ROBERT T. WATSON.

Any molder with an average knowledge of green, dry sand or loam molding, will certainly be surprised to find the amount of knowledge he will acquire by working in or visiting other foundries than those in which he has been accustomed to work. I refer more particularly to jobbing or machinery shops. I have had traveled molders working for me and found many of them of an inquiring turn of mind, always ready to ask the why and the wherefore, and in return to give their advice or relate their experience on a similar class of work. None of us are perfect, and none of us know it all. Being convinced of this I would never hesitate to allow them to make their suggestions, and if I found them good or better than my own ideas, be equally willing to accept the hint and give them the credit for it. This policy tends to establish a good feeling that will perhaps be of material assistance to you when confronted with difficulties in the future. Too much self-esteem is sorry principle on the part of a foreman who will not listen to any suggestion from his molder, but would rather sacrifice the interest of his employer than lower his dignity by condescending to accept advice. This is what is termed bull-headed management, and believe me, a great mistake and not to the best interest of our employers. I have worked under foremen that knew everything. To talk to them by way of suggestion was out of the question, and in the event of ultimate failure, they would not hesitate to cover up their own shortcomings by discharging one or more of their men, and seek the praise of those above them for their zeal in the firm's interest.

Compared with other trades, that of molding is compassed by a greater number of unforseen difficulties and calamities that are out of the power of a human being to obviate. Yet, invariably, these are placed to the credit of the unfortunate molder. Even thongh he can advance a reasonable excuse or prove beyond a doubt that it was out of his power to prevent it, no quarter is given by the unreasonable nor excuse accepted by those who know no better. The uncertainty of results in the molding shop is so well known, that without fear of successful contradiction, I make the statement that there never was yet the molder who made a continued success and never contributed to the scrap-heap.

By way of illustration, permit me to call your attention to a few of the unforseen circumstances causing loss, that have come under my personal observation.

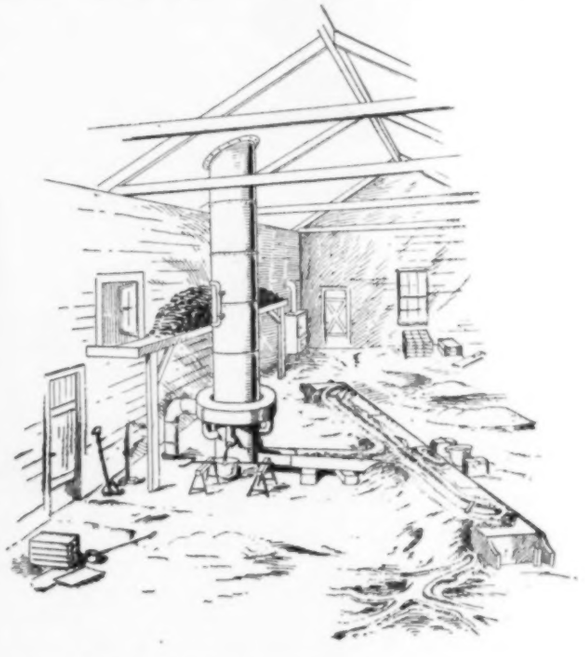
Casting a large H beam one time, we were astonished to find the metal slowly disappear with no apparent reason for it. We could not fill it and keep it full, so gave it up and left it for further investigation next morning. On careful examination we found that some animal had burrowed a hole from the sewer to the mold, which being covered with flour, proved an attraction, and having stood ready for casting from the day previous, it had plenty of time to complete the work of destruction.

The next case I would refer to was that of a large plunger pump, which being built in loam, required a pit about eight feet deep in which to cast it. The usual precautions were taken, so far as mechanical skill was concerned, to make it a success, but, as in the first instance, the metal slowly soaked away and would not stay in the mold. When dug out the cause was apparent. The ground upon which the foundry was built was of a rocky nature that required to be blasted to form the pits. They had left large quantities of loose rubbish and rock in the bottom of the pit, and had the idea that there was no necessity for a casing. The result was that when the pressure came on the mold the foundation was not strong enough, and the iron disappeared amongst the loose rock and rubbish.

The last incident I will recite is a common one with us, but when brought thus specifically to the notice of molders, may be of some future value. One day in midwinter we put up half a day's work and then knocked off to attend a funeral. During our absence the watchman either neglected or failed to keep the fires going, and it was not surprising that with the thermometer dancing about the zero point, the molds should be frozen solid. Had we known of it next morning steps would have been taken to thaw the molds out. Molten iron and frost won't agree, and in consequence a large loss was entailed from cutting, and many molds were torn out of shape. There was considerable swearing and threats to discharge, while charges of hard ramming, and careless venting were freely distributed; but great relief was experienced, when on shaking out a large mold, the frozen lumps of sand were noticed. The foreman's attention was called to this, then the other fellow got it, and peace and quietness prevailed until the next time.

These few examples will serve to show how many factors, apart from practical ability, enter into the probabilities of success in a molders' work. Were we to jot down all the losses we had experienced and to note their causes, their array would surprise and their variety confound us.

This article would not be complete were I not to refer briefly to another prolific source of loss, viz., the taking of contracts for work which is too large for the facilities of the shop, and requiring a resort to makeshifts which, while they serve to call forth the ingenuity of the foreman and molder, have in them always a large percentage of uncertainty and danger. This do-no-better style is of course largely peculiar to the smaller shops. The accompanying sketch will convey to you an idea of what I consider one of the most notable instances of this kind that ever came under my notice. When passing through a small country town my attention was called to a young man cleaning a casting about 18 feet long, 12 inches wide and 10 inches deep. I saw it was a sill for some building and would jndge it to have weighed about 1,200 lbs.



Naturally, I looked about for the foundry in which it had been cast, but saw none that would apparently answer the purpose. On making inquiry, I found that I was standing alongside of it, although the building, or shed, did not seem as long as the casting itself. Discovering the molder, a sociable fellow, I soon got all the particulars. He, with a helper and a boy, constituted the entire staff. He had been compelled to bed the pattern in cornerwise, so as to get room, and there being no crane in the shop, he covered it with four copes, so as to be able to handle them off and on. What interested me most, however, was the clever and unique way in which he maneuvered the casting of it. He had only two bull ladles of 200 lbs. and 150 lbs., respectively, while the furnace did not seem to hold more than 800 lbs. to the level of the tuyeres. He said he had banked up the tuyeres a little and converted one of them into a spout, from which he filled the two ladles after the furnace was full. He led the main runner, as shown by the sketch, from the spout of the furnace, using core-skimmers at each end to insure a clean casting. As soon as he had the two full ladles placed ready for pouring at the center-head, he tapped out the furnace and stationed the boy at the spout with two bent ¾-inch rods, ready either to allow the metal to run more freely or to cheek it as necessity might call for. In a cast of this sort it will readily be seen that owing to the pouring basins being made on the top of the flasks, there was considerable danger of straining, but this was obviated by having

a run-off at each end near the joint of the box, as shown. The sill being plain on the back required very little pressure. The result was a decided success. This incident brought home to my mind with peculiar significance the old adage that "necessity is the mother of invention," and confirmed me in the opinion expressed in the opening sentences, that no one knows it all, and ideas can be picked up from most unexpected sources; yes, even from an apprentice boy.

Losses in the molding shop will occur for all time, I presume, although I am free to admit that when science comes to our assistance and enables the molder to examine the interior of his mold before pouring, by the Roentgen rays, for example, many a loss will be avoided and many a heartache be saved to the molder.—[Iron Molders' Journal.

ACME MECHANICAL STOKER.

The essential features of the Acme stoker, as indicated in the sketch of it presented in this connection, are the fire-brick arch over the fire doors, and extending back several feet over the fire, securing ready ignition of gas as it comes in contact with the hot fire-brick; a hollow bridge wall, with air entering it from the back of the boiler through air ducts in the walls, or through one or two boiler tubes; the admission of steam to furnace. In an article in the *Electrical World*, from which we take the annexed illustration, L. H. Thullen gives the result of boiler room experience at an electric lighting central station, the mechanical stoker working a 40 per cent decrease in the fuel bill, with less labor, a steadier steam pressure and less wear and tear on the boiler and settings.

Fig. 1 shows a boiler set with the Acme mechanical stoker,

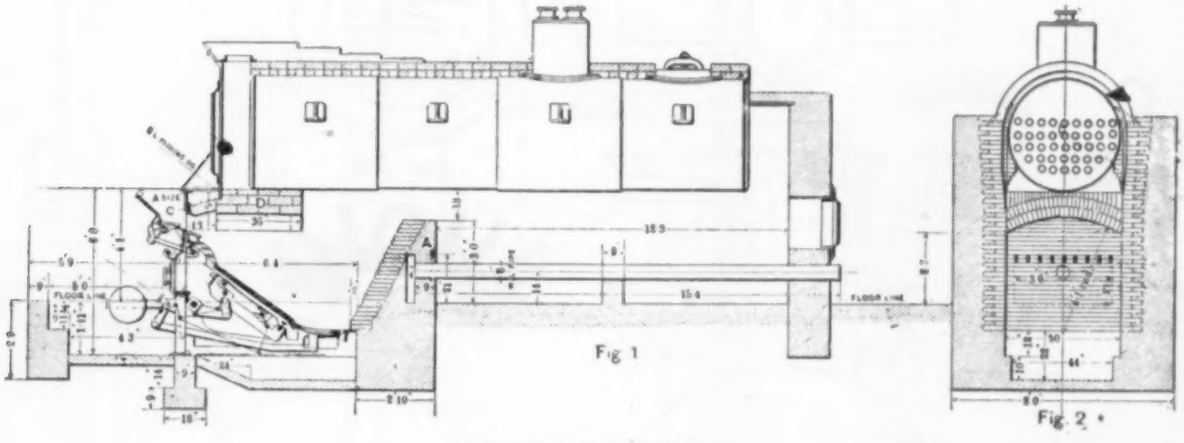


Fig. 1

Fig. 2.

ACME MECHANICAL STOKER.

hollow bridge wall *A*, with hollow space 36x21x4 inches, and nine openings, 4x11 inches, in front of bridge wall, as shown in Fig. 2. Also a six-inch iron pipe (boiler tube) *B*, in Fig. 1, to bring cold air from rear of boiler to bridge wall. The air coming through the pipe is heated very hot by coming in contact with the hot bricks in the bridge wall. The iron pipe will not be affected by the heat, owing to the circulation of air. An air space that would be very satisfactory could be made in the side walls to conduct air to the bridge wall. The pipe construction is intended for boilers already set, while the space inside of the walls is preferable for boiler settings under construction.

C, in Fig. 1, is a ½-inch gas pipe in which are drilled three ⅛-inch holes through which steam enters the furnace, and assist greatly in the combustion of smoke, besides keeping the grates free from cinders and improving the draft. Tests made with this steam jet show a slight economy in favor of its use, and also a higher furnace temperature and more consumption of fuel per square foot of grate surface. *D*, Fig 1, is a large fire-brick arch which extends back over the grates and materially assists in the working of the furnace.

The Acme stoker is manufactured by the Falls Rivet & Machine Co., Cuyahoga Falls, O. F. W. Weir, 406 The Rookery, Chicago, is Western manager. Mr. Thullen, in connection with his description, gives the following valuable suggestions as to general boiler practice: "The results to be obtained from a good draft cannot be overestimated, for upon the draft depends the amount of coal consumed per square foot of grate surface; it also aids in the consumption of smoke, prevents the coal from cindering and keeps the grates much cooler, thereby preventing the grate bars from warping. Sixty to seventy per cent air space in grates is none too small where run of mine coal is used. Where a stoker is not used good shaking grates will be found to give very satisfactory results, as the fire can be kept cleaner and brighter by their use. It is a well-known fact that a boiler worked at full capacity is more economical than at partial load; a few boilers forced for a few hours during the peak of the load are more efficient than running a number of boilers at full capacity for a few hours during full load and then running at under capacity or banking the fires the remainder of the time. A boiler that is kept clean is not injured by forcing it for a few hours. Good stack draft is very necessary to force a boiler and forced draft may be used without injury or lowering the all-day efficiency of the plant. Water in the ash pit will aid the draft, prevent cinders from running on the grate bars and prolong the life of the grates."

The New Shops of the Q. & C. Co.

The Q. & C. Co., Western Union Building, Chicago, is transforming the factory of the Abbott Mfg. Co., at Chicago Heights, which it recently acquired. The original building, now the main building, is 54x150 feet, two stories high. The first floor of this building is now used for making trimmings for car doors. The tool room on this floor is inclosed with glass and wire partitions and fitted with shelves and bins, the latter being 7x8 inches and 15 inches deep. The office, on the same floor, is finished in Georgia pine and furnished with a capacious brick vault. There is also a japanning room, 12x20 feet, with a baking oven 8x8 feet. In the rear is the shipping room, the floor being on a level with the floor of a freight car. The second floor is used as a drafting room, pattern shop and general mechanical work, including polishing and nickel plating. Check perforators are manufactured here. The building is lighted with electricity and equipped with a passenger and freight elevator. Fire protection is furnished by hose and by chemical extinguishers.

A new two-story building, 54x60 feet, has been erected and is now occupied. The ground floor is used for heavy machinery, lathes, drills, etc. On the second floor are light machines. Power is furnished by a Porter-Allen engine of 80 h. p., the steam plant consisting of two boilers, 16 feet by 60 inches, with Hawley down-draft furnace. A Scott patent feed-water heater of new design is provided. A separate building, 25x40 feet, is used for the storage of material and rough castings. A brick blacksmith shop, 15x18 feet, is equipped with two forges. The specialties manufactured by the company comprise the Dunham and Q. & C. trolley car door, the McKee brake slack adjuster, the Bryant patent portable and power cold metal sawing machines, the Q & C. automatic feed shop saws and the Williams valve adjuster. The company is just bringing out a new flush car door called the Q. & C. Hoyt. It also controls the sale for the United States of the Servis tie-plate, the Globe ventilator, the Q. & C. carbolineum or wood preservative, and the perfection oil purifier.

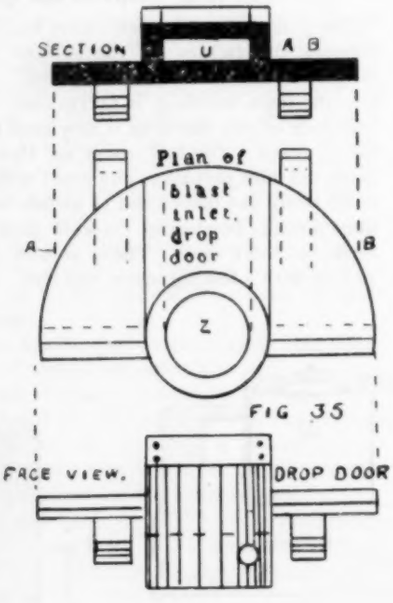
THERE were 110,000 tons of iron in the yards of the American Pig Iron Storage Warrant Co. June 10 and in the following 10 days 1,800 tons were added, making the total June 20, 111,800 tons.

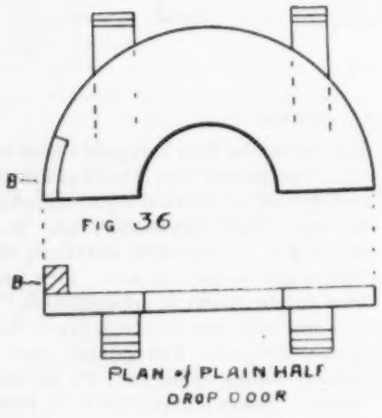
POWER OF BLAST PENETRATION AND IMPROVEMENTS IN CENTER BLAST.*

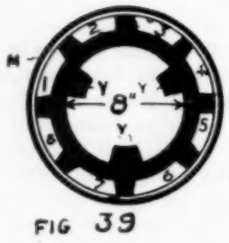
BY THOS. D. WEST.

There has been much speculation as to the force of blast existing in the center of a cupola. Some have gone so far as to assert that the burning out of a cupola's lining at the melting point was due to the force of blast from the opposite tuyeres. The conviction that blast expends its power most largely at the entrance of a tuyere has been an incentive to the writer to utilize "center blast," and the economical results which he has obtained from its use have demonstrated to him that his convictions on this point are correct. A little experiment which the writer conducted recently will show any one trying it the inability of blast to exert any great power or pressure in the center body of a cupola. This experiment consists in simply getting into the inside of a cupola after the bottom is put up and holding a handkerchief at varying distances from the outside tuyere openings, with the blast or fan running at full speed. In the 66-inch cupola shown in Fig. 40, having six tuyeres 3 inches by 16 inches, holding the handkerchief a foot away from the tuyere opening or inside surface of the cupola, the blast had no perceptible influence on it. This was a revelation to the writer, as he thought before entering the cupola he would be smothered with the effects of rushing air, but was happily disappointed. Of course, the writer does not wish to imply by this that when a cupola is filled with fuel and iron, the blast will not penetrate further toward the center; but nevertheless, it is very far from exerting the same pressure at the center as it does at the entrance. To more fully prove this, it is but necessary to watch a cupola at the close of its heat, when the stock is settled down, say, about half way, so as to enable one to observe more directly the action of the blast. Here a careful observer will readily notice that the action of the blast is to turn upward right at the tuyere's entrance with but a very small percentage of the blast reaching the central body. In fact, the blast at the tuyere entrance creates such excessive combustion at the outer circle, that very hot flames will be seen burning upward right over the tuyeres, playing against the walls or lining of the cupola, with the center body of the cupola comparatively free from live combustion. We may, by reason of greater blast pressure, or a smaller tuyere area at its entrance to the cupola, penetrate the center body of the fuel in a cupola to a much greater extent than can be obtained with the ordinary pressure used. Blast furnace practice demonstrates to us what high pressures can do to force blast to the center, but we find such a practice in cupola work to be very objectionable, simply on the ground that small tuyere area or high pressures of cold blast cause rapid chilling or closing up of the blast passage at the front of tuyeres. For this reason we find high pressures or small tuyere areas, especially where coke is used, impractical or very objectionable in cupola practice, because of the cold blast. If any one will conduct the experiment cited above, of getting into a cupola to test with a handkerchief the extent of blast penetration, the author believes he will be brought to realize more than ever the utility of "center blast" for cupola practice.

Ever since the writer first introduced "center blast" proper in his paper before this Association, in October, 1893, he has been continually experimenting to further improve and perfect center blast, with the idea of making it so simple and re-







*Read at the meeting of the Western Foundrymen's Association, Chicago, June 17, 1896.

liable that all founders would find it to their advantage to adopt such methods.

The objection to center blast, at the time of its introduction by the writer, was due to the difficulty of erecting same and connecting to blast attachments. By a study of this paper, those two objections will be found largely removed. In Fig. 40 is seen an arrangement designed by the writer, whereby the center tuyere is a permanent fixture, not requiring to be dropped with the bottom at the close of a heat, as is necessary with all other designs. This is only practical with cupolas over 50 inches inside diameter. For cupolas below this size, the author has designed the improvement seen in Fig. 37. The advantage of this construction lies in the "drop door" being so designed that it obviates the necessity of putting up and taking down blast pipe connections every "heat." It will be understood that in cupolas below 50 inches it is intended the center tuyere shall drop with the bottom at the close of a "heat." The writer has not, as yet, used the principle seen in the blast inlet drop door shown in Fig. 37, but from his experience he knows that if the plan shown is followed, it will prove quite a convenience over other methods now being advanced.

As will be seen, the writer advises the use of outside tuyeres in connection with the center tuyere, providing they are made independent of each other in action, by reason of valves or blast gates, as seen in Fig. 37, whereby the blast pressure can be perfectly controlled in the center and outside tuyeres to obtain whatever pressure in either may be thought best.

The blast area of the opening at U, Figs. 37 and 35, is to be found by dividing the area of the cupola by 30. If the cupola is 40 inches inside diameter, this gives an area of 41.89 inches, or, in rough figures, an opening 4 inches by 10 inches, and at I a diameter of about 7 inches. The width of the opening at V for the admittance of the blast to the stock in the cupola should range from 2½ inches to 3 inches, the larger space being best applicable for long heats. It will be noticed that the arrangement of drop door calls for a greater height of bottom sand by two to three inches than is usually adopted in the ordinary cupola. This may be objectionable for some cupolas, but the same can be overcome by having the drop doors extend lower with a flange around the circumference to project upward to close the bottom plate of the cupola, as suggested at B B, Fig. 36, and cutting a piece out of the bottom plate at B, Fig. 37, and then strengthening the same with a wrought sheet bolted to the bottom plate.

For holding up the drop doors with props, two bars are to be used as represented at E, one to be on each side of the blast inlet circle. H is a door so hinged and held up by means of the weight, wire rope, hook and staple seen at M, P and F, that should any occasion call for its being opened suddenly to release any slag or molten metal that might, from any cause, leak down the center tuyere, it can be quickly operated without causing any stoppage or much loss in blast. S is a peep-hole to be closed with isinglass. A is a rib to make a backing for clay to tightly close the joint of the drop door in its union with the wind box K, and which should be of the same area at A for the admittance of blast as that cited for the area at U. D is a recess to admit a slide valve to close the end of the wind box K. N is one of the ear-lugs for hingeing the drop doors. R is the sand bottom showing the cupola ready for its bed of fuel. C, the center tuyere, and X the covering cap. W, branch pipe for the outside tuyeres, and L for the center. The plan and section views of the drop doors seen at Figs. 35 and 36 will explain themselves.

In describing the large cupola, Fig. 40, the cap casting seen at Fig. 38 should not be less than 1¼ inch thick in any part, and the greatest attention paid to having the edge at R closely pricked with a double row of ¼-inch pieces of wrought iron

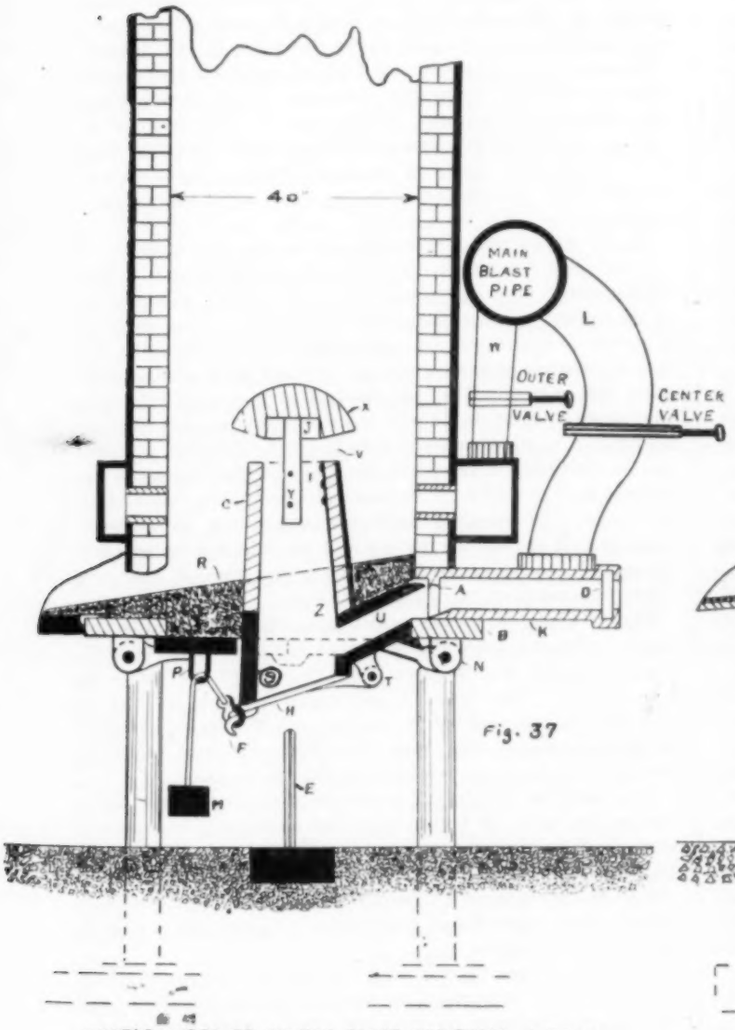
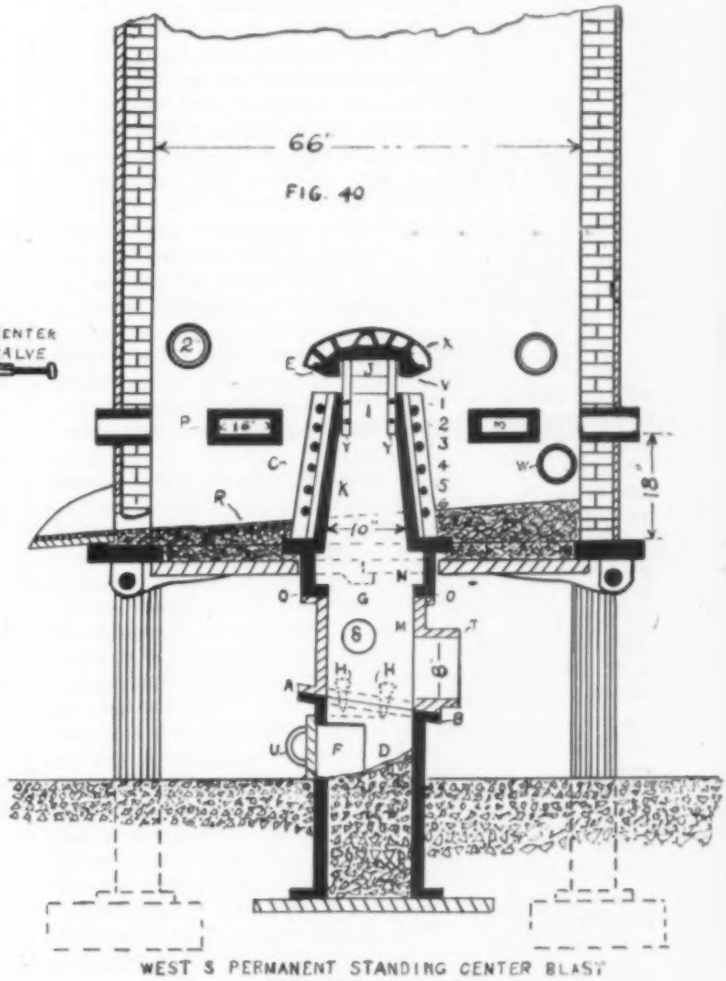


Fig. 37

WEST'S IMPROVED CENTER BLAST FOR SMALL CUPOLAS



WEST S PERMANENT STANDING CENTER BLAST FOR LARGE CUPOLAS.

rods or nails, as suggested at K and A B, Fig. 38. The cap X is the only part of the tuyere requiring extra care. This is necessary in order to get it to stand the action of the fusing heat and friction of the steady downward movement of the fuel and iron when the cupola is in blast. Protect the edge R so that the clay cannot be broken away from it, and you can then expect perfect success in utilizing center blast. The prickers C, D and E should extend about two inches high and be as thick as they can be comfortably cast on. X at Fig. 38 is a ½-inch hook cast in the cap to handle it by. The recess at J should be about 3 inches deep and of a diameter to admit the cap supporters, as seen at Y Y Y, Fig. 39. These supporters are made of 1¼-inch wrought iron bolted to the tuyere casting. It is not necessary to protect them by clay, likewise the under side of the cap at E, Fig. 40, as the cold blast keeps these points sufficiently cool to prevent them fusing or even getting very hot.

This cap should be about 4 inches larger in diameter over all than the outside of the center tuyere up at V. The center tuyere upright is made of cast iron. In the plan view at Fig. 39 are seen eight ribs cast so as to run the entire length of the tuyere, over which are placed ½-inch wrought iron rings, as seen at M, Fig. 39, and at the numerals 1, 2, 3, 4, 5 and 6, Fig. 40. Owing to the center tuyere being made on a taper, as shown, these rings are readily adjusted to tighten themselves. We find this method better than prickers to hold the clay and to extend the life of a tuyere to run through a large number of "heats." A ¼-inch wrought iron or boiler plate upright tuyere could be used in place of the cast iron one shown, which is about ¼-inch thick, and for cupolas where it was intended to drop them with the bottom, boiler plate center tuyeres would be best on account of their being lighter to handle. These upright tuyeres and covering caps are dried in their positions or in an oven before being subjected to a regular "hea "

It is to be understood that the tuyere shown with the large cupola or Fig. 40 is a permanent structure, not to be dropped with the bottom, thereby overcoming the inconvenience heretofore experienced in being compelled to erect a center tuyere at every "heat."

The recess at N, Fig. 40, is caused by reason of making that part of the diameter sufficiently large to admit of the doo dropping without striking the flange through the section O O. A flange will be noticed on the center tuyere at its lower body projecting over the drop doors. This is needed in case it might, at any time, be found necessary during a heat to move the section M. This section is seen to have one end on an incline as at the flange A and B, and on removal of the pins H H can be readily slid out from under the center tuyere, after the branch blast pipe attached to T is disconnected. In a few moments the section M can be replaced ready again for the passage of blast. At F is shown an opening level with the ground floor, at which point is also seen a door, U, which should extend fully half the way round the column, as shown and have double doors, so that should any iron or slag for any reason chill inside of the column at its bottom it can be readily removed. The slope D at this door inside the column is formed of sand. If rough castings are used, the points at A B and O O can be bedded in soft clay to make them wind-tight. Of course these joints could be planed to save this labor, if desired.

The writer has not shown any outside blast connection or branch pipes to lead to the center tuyere projection T, Fig. 40 for the reason that there are but very few cupolas alike in their wind box and blast connections.

When first starting to use center blast, the author thought he would have difficulty in obtaining a lining for the tuyere and covering cap that would withstand the fusing heat of the cupola. Experience has proved that any fair grade of fire clay will answer, and while it is advisable to have an extra dried tuyere and covering cap on hand, many will be surprised to learn that where center tuyeres are not dropped with the bottom, they will run for a dozen or two "heats."

The center tuyere cupola excels any other form in the saving of fuel, lining and time in melting. It also excels by reducing the wastage of iron through chillings being contaminated with the cloggings around the tuyeres and refuse of a "bottom drop." This is owing to the excess of heat at the end of a "cast." As a general thing, the longer the heat, the greater the fluidity of the metal obtained. With this center blast no fumes or gas are to be seen shooting up out of the stack at the close of a "heat."

Every now and then we hear of somebody resurrecting old designs, thinking they have something new. The author has now special reference to the plan being advocated of drawing in a cupola above the tuyeres, making its area at the bosh thus formed about a third less than any other part of the cupola, thinking by this to attain the end gained by center blast. The bunging up due to such designs, where heats are extended to any length, long since has relegated this old design to obscurity. The writer has tried all these methods to learn just how far they could be utilized in an effort to approach center blast, but has found them of little value.

The arrangement of the designs for center blast herein described admits of a cupola being run to finish its "heat" should anything go wrong with the center tuyere. The removal of the section M, Fig. 40, or the opening of the drop door H, Fig. 37, admits of the center tuyere proper being plugged up with stiff clay so as to shut its blast off and permits a continuation of a heat by the use of the outside tuyere.

The arrangement shown in Fig. 40 has been used in the writer's foundry for the past four months with the greatest success, not only in "heats" of an hour or two, but also in "heats" of four or five hours, since we seldom melt less than 40 or 50 tons at a "heat," in the large cupola shown. It will thus be seen the center tuyere has been subjected to a very rigid test.

Briefly stated, the advantages which we find in favor of "center blast," in comparison with other methods are: 1, Reduction of fuel from one to eight to one to twelve; 2, less wear on the lining; 3, increased speed of melting; 4, less wastage of chilled iron and shot; 5, less absorption of sulphur by the iron; 6, absence of flame escaping from the stack at closing or other part of heat. The iron we melt is mostly all pig, only shop scrap being mixed in with it, and the mixture we use must not exceed .10 in phosphorus, which calls for a greater percentage in fuel than if the phosphorus was higher, owing to the greater fluidity which an increase of phosphorus can add to the metal. In charging the cupola seen at Fig. 40, we place 1,430 pounds of coke for the bed and 390 pounds between each charge of iron. On the bed we have four tons of iron and three tons between every charge of coke.

For a "heat" of 40 tons, which is as small as should be run in such a large cupola, the amount of fuel used leaves us melting 1 to 13.09. For 50 tons, 1 to 13.49. For 60 tons, 1 to 13.93. For 70 tons, which is the largest heat, we have run 1 to 13.97, and, as said before, the iron is hotter at the end than at the beginning of the "heat," and it has sufficient fluidity to run stove plate, if not detained too long in the ladle.

The writer wishes to call attention to the fact that in figuring up the ratios of fuel to iron used as ranging from one to eleven and from one to twelve, no account has been taken of the coke saved from the "bottom drop," which ranges from 300 to 400 pounds at a "heat." Did we take note of this, it would safely increase our melting ratio to read one to twelve, up to one to fourteen.

The more center blast is used intelligently the faster will it supersede all other forms of melting. Different conditions call for different designs, as the plan which proves a success for one cupola or class of work may be an utter failure for another. Each founder should judge for himself as to the best methods to be adopted in his work.

A LETTER from Gustav Halberstadt, Copenhagen, dated March 6, 1896, is reproduced and generally distributed by Jenkins Bros., 71 John st., New York, together with a half-tone of the photograph referred to in it. The letter says: "Under separate cover I have to-day sent you a photo of the Imperial Russian yacht Standard which is built here, and to which I have delivered several hundred of your valves."

THERE was recently rolled at the works of the Stockton Malleable Iron Co. at Stockton-on-Tees, Eng., a steel plate weighing 12,320 lbs., the sheared size being 76 ft. 3 in. by 5 ft. by 0.6 in. thick. The width before shearing varied from 5 ft. 2 in. to 6 ft. 2 in. Another large plate recently made by the Dowlais Co. in Wales, was 69 ft. long, 4 ft. 2½ in. wide and 0.6 in. thick; it weighed 8,200 lbs.

THE WESTERN FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, June 17, 1896, at the Great Northern Hotel, Chicago. The president, A. W. McArthur, occupied the chair.

The following were present: A. W. McArthur, Rockford Foundry Co., Rockford, Ill.; F. M. Lyon, Burlington Route Foundry, Aurora, Ill.; G. H. Carver, Flano Mfg. Co., West Pullman, Ill.; W. F. Jacobs, J. E. Porter Co.; Ottawa, Ill.; W. N. Moore, Joliet Stove Works, Joliet, Ill.; John Pettigrew, Illinois Steel Co., Joliet, Ill.; J. H. Dalton, Walburn-Swenson Co.; Chicago Heights, Ill.; John T. Rowlands, J. I. Case, T. M. Co., Racine, Wis.; A. Sorge, Jr., secretary; O. T. Stantial, Illinois Malleable Iron Co.; S. T. Johnston, Whiting Foundry Equipment Co.; Wm. Ferguson, Gates Iron Works; L. W. Lukens, F. G. Coffeen, Deering Harvester Co.; H. S. Vrooman, Garden City Sand Co.; A. M. Thompson, Link Belt Machinery Co.; Robert Barr, A. J. Oehring, B. S. Summers, Western Electric Co.; John W. Hughes, Weir & Craig Mfg. Co.; Wm. Nygren, King & Andrews Co.; Robert Gibbs, Lake Shore Foundry Co.; B. M. Gardner, *The Iron Trade Review*; J. E. Evans, S. Obermayer Co., all of Chicago.

The secretary read the following applications for membership: Jas. A. Brady (active), J. W. Reedy, Mfg. Co., Chicago; C. O. Billow (associate), Chicago; A. H. Blackburn, (active), of Fuel Economizer Co., Matteawan, N. Y.; Chas. S. Burt, (associate), Chicago, and Edward A. Sumner (active), American Radiator Co., Detroit, Mich. On motion, the applicants were elected members of the Association.

The secretary read a paper by Thos. D. West, on "Power of Blast Penetration and Improvements in Center Blast." It is printed on another page.

The secretary then read a letter from Mr. West, which had been received after the paper.

Discussion on Center Blast.

Mr. W. N. Moore: I have had no experiences in center blast cupolas. I do not know how much I might have had if I had not found some other people were putting them on the market and waited to see what the result would be. That is about all the information I possess, and I guess everybody has that. The Foundry Outfitting Co. has a center blast cupola on the market and we were disposed to try it.

Mr. West's letter of explanation as to the way in which he came to make an error in getting his coke consumption, seems to me to rather weaken his assertion of the remarkable results he obtained. Without being in a position to criticise or say that Mr. West does not get these results, because we have to take his statement as it stands, it is evident that he is depending upon "forkfulls" of coke. Mr. West corrects his result and says that 13 to 1 is too low. I think there is only one way to determine the amount of coke consumed in the cupola, and that is to weigh every pound of coke as it goes up on the scaffold. I think the weight of Mr. West's argument would be very much greater if he were able to state that the record of the coke had been accurately kept. I think his paper would be stronger if his letter of explanation had not been made. However, the subject is a very interesting one, and whether Mr. West is consuming 12 to 1 or 10 to 1, he is evidently satisfied that he is getting very much better results. I think it is a subject that will bear investigation. Several of his propositions seem to be reasonable.

Mr. A. W. McArthur: It is very much to be regretted that Mr. West does not give a great many of his facts in much more exact shape. In his little experiment of going into the cupola with a handkerchief there is not enough definitiveness about it to make it at all valuable to me personally, and I do not see how it can be to anybody. I think that if he had held his handkerchief a foot away from the tuyere opening he would have found a very decided current of air.

Mr. Ferguson: I never had any experience, either experimentally or practically, with center blast tuyeres. I have thought for some time past that it was the proper thing to do with a cupola. I am much pleased with Mr. West's paper and explanation of the work he has put upon the thing. As to the results that he is getting, I think that they are a little visionary. I am skeptical of these results on account of experience I have had with other patented cupolas that have claimed economy and, up to date, I have not found any of them more economical than other cupolas. The objection I have always found to a center blast was taking care of it. The amount of labor there would be in taking care of it would over balance any benefit that might be deriven from its use. The only way to get at this thing is to go at it and see what can be done. He states the thing very clearly and probably if foundrymen would take hold of it they could help him perfect it.

Mr. Pettigrew: I have never had any experience with center blasts. I think if any foundryman will go into an empty cupola he will find the experience of Mr. West just as he states it. But let him put a charge on—say enough to make a bed for the heat—and then go in and try his handkerchief experiment and see what it will be. I think he will find that the diffusion of the blast through the cupola is pretty even. It will diffuse itself through the fuel in pretty uniform ratio. The slag and iron will stay right around the tuyeres, caused by the chilling of the blast, then we have got to have a center blast to melt the iron, and you will find after a large heat, if you have a clean drop, that the center will drop clean on account of the excess of heat being in the center. My idea has always been to have a hot blast for the cupola. My ideas have always run more to having an arrangement of tuyeres something like a blast furnace. By this arrangement of tuyeres you would find, with the warm blast up to 300° or 400°, there will be a great saving in foundry practice.

Mr. Moore: I am right in line with Mr. Pettigrew in regard to what he says about heating the blast. I would like to ask the secretary, who I believe figures on these things once in a while, whether there are any figures to show the amount of heat units or coke that is used in heating the air from its normal temperature up to say 500°, or to a point that possibly can be gained by the use of reheating appliances which are used to heat blast furnaces.

Mr. Sorge: I have made such estimates, Mr. Moore, but unfortunately, I have not them with me. I cannot give the figures. It is not a very difficult thing to determine. I went into that subject not very long ago in looking over a foundry and I found that if about 25 per cent. of the heat which usually escapes from the top of the cupola—that is that heat which is produced by combustion—were used for heating the blast, that the temperature of the air could be raised up to the vicinity of 450°—that is, assuming the melting capacity of the cupola to be eight of iron to one of coke. By means of this heating of the air the melting capacity would be at the ratio of one to 14.

Mr. Moore: The theoretical consumption of fuel to iron would be about what?

Mr. Sorge: About one to 32 and the actual is about one to eight—that is on the average daily run. By saving 25 per cent of the heat that usually goes out of the stack, and this can be done without any difficulty, I think will bring the ratio from one to eight up to one to 14.

Mr. Ferguson: How do you account for that rapid increase in the ratio when you only estimated one-fourth of the heat as wasted?

Mr. Sorge: I account for it in that three-quarters of the total heat is wasted originally.

Mr. Ferguson: How can you increase that 1 to 8 to 1 to 14?

Mr. Sorge: You are losing at least 75% to 80% at present in the stack. If you could save about 25% of what you are losing in the stack, which I think can be done very readily you can raise it to 1 to 14. In heating up to a temperature of this kind, say 400° or 500°, no special cooling apparatus is needed. In a blast furnace they run the heat up 1,100° or 1,400°, but in a cupola I would not use more than 450° to 500°.

Mr. Carver: I note that Mr. Sorge states that he considers it very good foundry practice in cupola melting to obtain a melt of 8 lbs. of iron to one of coke. It seems to me that the ordinary owners of foundries would consider it very poor practice if their foreman or superintendent did not obtain better results I do not understand how Mr. Sorge makes out as extremely good foundry practice to melt eight lbs. of iron to one of coke.

Mr. Sorge: I did not say it was extremely good foundry practice. I said it was ordinarily good foundry practice. I

think that if you will go through the foundries in the country and get their actual weights of iron and coke you will find that it is good foundry practice. I have melted 12 to 1, and I can do it again, but I have yet to find the practice the year round with a correct record—actually weighing every pound of coke going on the platform and every pound of iron going on the platform—to exceed 1 to 8. That is my position in the matter.

Mr. Thompson: I do not think the paper has gone far enough to give us an idea whether this is economical melting or not. While Mr. West claims to show a saving of fuel it would have been better if he had shown the cost of repairs.

Mr. Carver: It is a question whether, in actual practice, the blast around the outside of the heat would not tend to bring the temperature of the central part of the heat higher than if the blast were confined to the center and expected to radiate heat to the outer edges of the cupola? Now, for instance, you take an ordinary coal fire in a stove. You have no difficulty in the burning of the fuel in the central part of the fire. If there is any dead coal anywhere it is usually around the outer edges of the stove and the lining. I bring this question up to know whether or not the present diffusion of air through the tuyeres from the outside does not give better results on account of the better distribution of the air than if confined to a central location.

Mr. McArthur: Mr. West's whole contention is that with tuyeres on the outside of the cupola instead of in the center of the cupola, the blast does not penetrate to the center of the charge.

Mr. Pettigrew: I do not hold to that opinion at all. I think the first remarks I made would show that the center is always the hottest part of the cupola. Any one that has noticed a cupola dropped will always see—it does not matter how much chilled iron there may be on the outside—that the center will always drop clean, evidently showing that the hottest part is right in the center of the cupola. That is the point I tried to make. I am sure it will hold good in any cupola. Mr. West places his blast both outside and in the center.

Mr. Moore: I made an experiment some years ago. The idea was that the outside of the cupola was cooler than the center, as shown by the bridging of the outside, therefore the iron should be in the center. Working on that idea I went up on the charging-floor one day and, much against the advice of the wise-acres, I worked the charge having the iron pretty much in the center and the fuel pretty much on the outside. I presume there are others that have worked on this and have had the same result. If there are those that have not, I would not advise them to do it. If there was not a strong tendency in the ordinary cupola to drive heat from the outside toward the center an experiment such as I tried would not have been failure.

Mr. Gibbs: My experience in charging iron in the cupola is to make the fuel and iron as even as possible. Put on your coke even and your iron in the same way. I have always found it to melt better in that way. As far as 8 to 1 is concerned, I think that is pretty good cupola practice.

Mr. Stantial: I should like to ask some questions in regard to the utilization of the heat in the top of the cupola. I would like to know if any of the members have made any experiments in that line. I have in mind one experiment that was made. A foundryman made up his mind that the waste heat could be utilized and he put his boilers on the top of his cupola, but it was a rank failure.

Mr. Moore: The utilization of waste heat in the cupola is one that the Bessemer steel men are in a position to solve and their interest in the matter is greater than any one else's. They have cupolas that work day in and day out for a week at a time, and yet, for some reason, although they spend thousands of dollars—I think the ratio is $3,000 expenditure for the saving of one cent a ton on product—they have not investigated it. Whether it is one of the things they have overlooked, or where any one has gone into the subject thoroughly enough to demonstrate that it is impracticable, I do not know. I have asked some of the engineers in connection with steel works why they did not abandon their cupolas and put in a miniature blast furnace and run it, but I have not got a satisfactory answer. The thing has never been done. There seems to be a difference of opinion as to its practicability. Some have told me that the lining could not stand and others have not given any good reason. There is the place where the circumstances are favorable and I think we must look to the steel people to bring out the utilization of waste heat.

Mr. Stantial: In cupolas of the present day it is generally the custom to make the tuyeres so that the entrance from the blast-pipe is reduced and the tuyeres passing through the lining are broadened out so that the area of the tuyeres where the air passes into the cupola is something like twice the area of the tuyere where the air enters it. I would like to know why there is any advantage in this or why it should not be the other way.

Mr. Vrooman: The air when it strikes the tuyeres will spread out. If they were pointed it would not.

Mr. Pettigrew: I know of a cupola that had a direct pipe 12 inches in diameter right into the cupola and did good melting. One tuyere without any blast box at all.

Mr. Sorge: If you would introduce a very intense blast at one point you would produce a very high temperature and burn out your fuel at that point and burn holes right through. I believe the idea is that of diffusing the blast and reducing its intensity at the point where it comes in contact with the fuel.

Mr. Ferguson: I am aware that that point is claimed by the designers of cupolas, but in my own practice I have not found it so. I can recall a furnace of 36-inch diameter that ran with its four or five inch iron tuyeres direct, each one leading to the center of the furnace, and for speedy melting I have not seen anything yet that surpassed it. As for the lining of the furnace, I can state that I was in the shop for three years and that the furnace was not relined at the melting point or any other portion. I was told that it had not been relined for four years previous to my going there.

Mr. Dalton: I have a furnace that is very similar to that, and it is very easy on the lining. We have not lined it for two years and it is just in shape to be lined now.

Mr. Moore: I think in speaking of the duration of the lining of a cupola, the amount of brick used for patching should be taken into consideration. We ran a cupola for about a year and it got where it ought to be relined. It was not convenient to do it, and we ran it pretty nearly another year and did not reline it, but I think that if we had relined it when it needed relining, we would have saved in brick enough to make us come out even. It is sometimes the case that when a cupola is run for a long time without relining as much brick is used for patching as would have been for relining, if not more. I have a record of a long-running cupola, but I do not know how many bricks were used to keep it in order, but I know there were a great many.

Topical Questions.

On motion, the editing committee was requested to put this matter of center-blast cupola on the list of topical questions, to be discussed in its order.

On motion, it was decided to take up topical question No. 6 for discussion. It reads as follows:

"In your experience, what is the most efficient method of cleaning light castings"

Mr. Sorge: I would like to state for the information of the Association that I am anticipating getting a paper on sand-blast from Ward & Nash, and I am also trying to get another from F. A. Goodrich & Co., of Detroit. It seems to me the sand blast will be taken up most satisfactorily by these gentlemen who make a specialty of it.

Topical question No. 7 was read as follows: "What is the proper temperature at which to bake cores? What method do you use for determning this temperature?"

Mr. Stantial: On our small cores we use steam and it takes a great deal longer to dry them than it does with the fire oven, but we can give them time. We are making them continuously during the day and have relays of ovens.

Mr. Lukens: Our ovens are constructed with shelves. I put the thermometer in and left it five minutes. A two-inch core was dried in 1½ minutes and the temperature went up to 275°. When it was cooled it was fit to use in the mold.

Mr. Pettigrew: Since joining the Western Fourndrymen's Association I have gone around among the foundries more than I have before, especially in Chicago. In visiting the Sargent Co.'s works I found that to be the only place where

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oil was introduced in the core oven, or ovens of any kind. I would advise all the members of the association to visit these works. It is a clean heat and a good deal cheaper in the drying of both cores and molds.

Mr. McArthur: Did you see any device that would indicate the temperature of the oven?

Mr. Pettigrew: No. They can tell after a certain amount of experience. In Pittsburg last year I noticed that the foundries all used natural gas, but they used it through a bed of small coke. They put a bed of coke on the fire and introduce the gas below that. It is clean and quick.

Mr. McArthur: Is this oil flame in the oven at the Sargent Co.'s works?

Mr. Pettigrew: Right in the oven without any bridge-wall.

Mr. Sorge: How many burners have they?

Mr. Pettigrew: Two in each oven.

Mr. McArthur: It seems to me that the matter of core ovens is too large a subject to be dismissed. I think it is worthy of the special investigation of a committee to report two or three meetings hence after collecting all the possible information.

On motion, the president was authorized to appoint a committee of three members to investigate the matter and make a report at the next meeting as to the best method of heating core ovens, the regulating of them and the proper temperature at which to bake cores.

The meeting then adjourned.

Indiana Tin-Plate Operations.

We give, just as we find it, in the South Wales correspondence of the London *Colliery Guardian*, concerning the operations of Indiana tin-plate plants. There are not eight plants in Indiana, however, but six. Whether other statements are as inaccurate we are not prepared to say: "In view of the position of the tin plate trade in the immediate future, information just to hand as to the state of affairs in the States is of importance. It appears that in four of the principal coast ports there—New York, Philadelphia, Baltimore and Boston—the total receipts of tin-plates in 1895 amounted to 3,207,083 boxes. The most successful of American tin-plate mills seem to be located in Indiana, where there are eight works, and from an official bulletin it is gleaned that in 1895 the eight works turned out a product worth $2,810,566. Raw material used by these works cost $1,556,648; wages to the amount of $782,676 were paid to 2,453 persons. The highest wage paid for skilled labor was $9.50 a day; 98 men received from $8 to $9 a day, and 632 men received $4 to $7 a day.

LOUISVILLE & NASHVILLE has reduced freight rates on pig iron and iron pipe from Birmingham to New Orleans, designed for export, 80 cents per ton, making the rate $1.60. This is calculated to stimulate export business.

THE Iron City Fire Brick Co. has been organized at Phillipsburg, Pa.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

The Compressed Air Power Co., of New York, has been incorporated; capital $1,000,000. Directors: J. McK. Wight, A. C. Jopling, A. C. Weppler, of New York, and others.

Du Mont Tool Co., Buffalo, N. Y., has been incorporated with a capital of $25,000. The directors are Charles G. Du Mont, Mary R. Du Mont and L. V. Hardie, all of Buffalo.

The Brooks Spring Seat Post Co. has been incorporated at Chicago, with a capital stock of $25,000, to manufacture bicycles, by Howard K. Brooks, George A. Damon and Geo. F. Wheeler.

The Eagle Foundry Co., Greensboro, N. C., wants to buy an elevator to carry iron and coke in foundry, and will buy also pulleys and shafting. The company is building a new foundry and adding a new cupola.

The Judson Governor Co., of Rochester, N. Y., has been incorporated, with a capital of $50,000, to manufacture steam governors, castings, etc. Directors are J. Lee Judson, Charles B. Judson, Harry L. Brewster and George D. Hale.

The Remlik Co., of New York City, has been incorporated to manufacture machinery, mechanical devices and apparatus. Capital $10,000, and directors: Charles E. Kilmer and William Randall, of New York City, and Edward Wample of Fultonville.

At the office of the Supervising Architect, Washington, D. C., sealed proposals will be received until 2 P. M., July 14, 1896, for all the labor and materials required for the low-pressure, steam heating and mechanical-ventilating apparatus, including power boiler, etc., of the U. S. court house, postoffice, and custom house building at Sioux City, Ia.

New Construction:—

The Lozier Mfg. Co., of Cleveland, O., has broken ground for its steel tube works to be erected at Greenville, Pa.

The Berger Mfg. Co., of Canton, Ohio, is pushing to completion a new building, 200 x 60 feet, in which it will manufacture the Berger patent lock jointed steel tubing for bicycles.

The John Dunlap Co. has bought a site at Homestead, Pa., for a tin plate plant, at $25,000. The property consists of 35 acres. The building, covering three acres, will be put up this summer.

The plans for the new machine shop and boiler shop for the Seaboard Air Line, at Portsmouth, Va., have been completed, and the work will begin immediately. The new building will be 80 x 312 feet, fitted with modern machinery for locomotive repairs.

At Pittsburg the Fox Pressed Steel Co. has taken out permits for its new buildings consisting of two shops and a two-story brick office building. The shops are to be of iron and one story high. One is to be 60x283 feet, and to cost $15,000; and the other 112 x 439 feet, to cost $25,000.

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Among buildings to be erected by the Georgia Car & Mfg. Co. at Savannah are the following: Engine and boiler department, 75 x 106 feet; machine, blacksmith and truck department, 106 x 375 feet; passenger erecting department, 106 x 500 feet; freight erecting department, 106 x 600 feet.

Additions, Enlargements, Removals, Etc.:—

It is reported that the Pittsburg & Western Railroad will remove its repair shops from Allegheny, Pa., to DeForest Junction, near Niles, O.

The Woodberry Mfg. Co., Milwaukee, Wis., is enlarging its machine shop to nearly double the present size, and is adding some new machine tools.

The Chantrell Tool Co., Reading, Pa., will increase its stock to $60,000, and will make extensive improvements in its plant by the addition of new machinery.

Plans have been prepared for the enlargement of the factory of the Frontier Iron Works, at Detroit, by the addition of a fourth story, 48x148 feet in size. The addition will cost $7,000.

Hart Mfg. Co., Cleveland, O., manufacturers of duplex die stocks, will add considerably to its plant during the next two or three months. Its business is excellent, especially for export.

A. B. Farquhar Co., York, Pa., manufacturer of agricultural implements, has largely increased its facilities, especially in the engine and boiler department and foundry, putting in new tools, electric cranes, etc.

The Draper Machine Tool Co., of Worcester, Mass., will build a three-story addition to its plant, which is to be 68 x 54 feet. The first floor will contain a blacksmith shop and a pattern room and drafting room.

The stockholders of the Glasgow Iron Co., Pottstown, Pa., will vote on July 30, on the plan of increasing the capital stock of the company by $300,000. The object is the erection of an open hearth steel plant. The proposed site is near the Valley mill of the company and adjoins the works of the Ellis & Lessig Steel & Iron Co.

Wells Bros. & Co., Greenfield, Mass., manufacturers of screw cutting machinery, are erecting a new building, 80 x 100, one-story high, of slow burning construction, to be finished by August 1. The new building is near the present factory and will be run by electric power transmitted from the latter, for which large new engines and dynamos will be put in. The addition will be used entirely for the machinery department

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1—15″ Youngson Shaper.
1—15″ Smith and Mills Shaper.
1—10″x5′ Prentice Engine Lathe.
1 each 14″ and 15″x6′ Ames Engine Lathe.
1—16x5 ft. Bullard Engine Lathe.
1—18x8 ft. L. W. Pond Engine Lathe.
1—24x8 ft. Phillips Engine Lathe.
1—24x14 ft. Lathe & Morse Engine Lathe.
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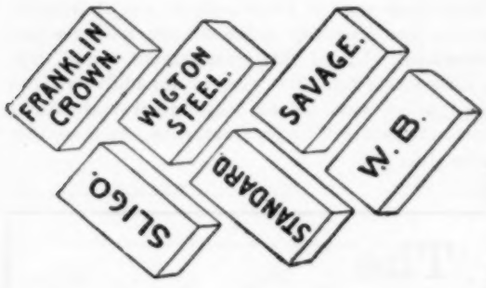

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leaving the present plant to be used exclusively for the manufacture of small tools.

General Industrial Notes:—

The Altoona Iron Works, which have been idle now for two months, have resumed.

The Panhandle road has decided to relay all tracks in tunnels with 60 foot rails.

The Illinois Screw Co., Chicago, nearly doubled its business in the year ending May 31.

The new wire nail works of the Hogan Nail Mfg. Co., Erie, Pa., will be put in operation soon.

The Sylvan Steel Works, Davenport, Ia., have closed down, owing to lack of orders, with no date fixed for resuming.

Over 200 employes of the D. L. & W. machine shops at Scranton, Pa., have asked an increase of 15 per cent. in wages.

The Hollinger Fence Co., manufacturer of fencing, Greenville, O., intends to enter extensively on the manufacture of wire nails.

The Glendon Iron Co., Easton, Pa., will soon blow out its furnace. The affairs of the company have been in the hands of receivers for several months.

The Alcania Tin & Terne Plate Co., Youngstown, O., will not accept the offer made it to remove to another city. The offer is open, however, for 12 months.

The old rail mill of the Eagan Thompson Steel Works which is now run entirely on street rails, and which has been idle for two months past, resumed last Monday.

The Semi-Steel Casting Works, of Muncie, Ind., have changed hands, the Williams Bros. having sold them to James F. Mockfrom. The plant is now located at Hartford City, Ind.

The Jefferson Steel & Mfg. Co., with an initial capital of $250,000, is repairing the Henderson steel plant at Birming

ham, and will shortly manufacture steel by the Hawkins process.

The C A C tie plate will be manufactured by the Johnson Co., which has acquired the sole manufacturing and setting rights. The company has made improvements in the method of rolling the lags and will push the use of this plate vigorously.

The C. H. Haeseler Co., of 1001 Hamilton street, Philadelphia, has recently been incorporated. This company makes a specialty of air tools, and has recently acquired control of the patent rights of the Keller pneumatic hammer. Among its other special tools are the Phoenix portable power drills, sand sifters, crane motors and hoists.

The slabbing mill and the large plate mill of the Bethlehem Iron Co., at South Bethlehem, Pa., are practically completed. The foundations for the universal plate mill are in and the machinery has begun to arrive. The new plate mills are housed in a splendid building, about 1,000 feet long, which constitutes an extenston of the open-hearth department.

Locomotive building.—The Pittsburg Locomotive Works have a contract from the B. & O. road to build 20 consolidation locomotives. The Big Four has given an order to the Richmond Locomotive Works to convert 60 locomotives from simple to compound engines. The Imperial Railways, of North China, will open bids August 25 for four passenger and four freight locomotives.

The Illinois Steel Co. has declared a dividend of 1½ per cent upon its capital stock of $18,650,635. The officers of the company report its condition much better than it was at any time last year. The strike has had little if any effect upon the company so far. This second dividend of 1½ per cent comes within four months of the preceding one, which was the first dividend paid in months.

The New York Car Wheel Works, of Buffalo, N. Y., have established a branch of their works in Buda Pesth, Austria-Hungary, and the making of wheels on the "Griffin system" has already commenced. The plant employs, at present, 150 men and it is expected to increase the number at an early date. Mr. Griffin is now in Buda Pesth and is reported to have made contracts to establish similar plants in other European countries.

At Pittsburg, Runyon, Stubbs & Co., of Cleveland, issued a foreign attachment against the Ohio Steel Co. and summoned as garnishees Naylor & Co., the Pittsburg Tin Plate Co., the Star Tin Plate Co., Zug & Co., the Pennsylvania Tin Plate Co., W. P. Snyder & Co. and Preston & Co., of Pittsburg. Bond in $60,000 was given. The suit grows out of a pig iron contract between Runyon, Stubbs & Co. and the Ohio Steel Co. The latter company says that it holds funds in its possession due. The Runyon, Stubbs & Co. to protect itself on an unfilled portion of the contract.

The basic open-hearth steel plant to be built at Sharon, Pa., is to be larger than was first contemplated by the plans of the Sharon Iron Co., Ltd., and subscriptions to the stock of a new organization have been made by local capitalists. The capital will be $350,000 and the company will be incorporated at once. Among the directors are John Casley, T. J. Forker and Hon. J. S. Fruit. Frank H. Buhl has been elected president; Theo. Buhl, vice-president; David Adams, treasurer, and J. M. Pressley, secretary. The first three of these officers are also officers of the Sharon Iron Co. The city council of Sharon has agreed to the vacation of portion of a street, so that it may be included in the steel plant site.

FOURTH OF JULY EXCURSIONS.

Special Rates via Pennsylvania Lines July 3d and 4th.

For the accommodation of persons desiring to spend the Fourth of July away from home, excursion tickets will be sold Friday and Saturday, July 3d and 4th, from ticket stations on the Pennsylvania Lines west of Pittsburgh to any stations on those lines within two hundred miles of the station where tickets are purchased. Under this arrangement round trips may be made for a single fare, but tickets for adults will not be sold for less than 25 cents, nor for children at less than 15 cents. Excursion tickets will be good returning up to and including Monday, July 6th.

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Kellogg Weldless Tube Co.,

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For Hydraulic Tubes, Jacks, Presses and Hoists, Lathe Spindles, Bicycle Hub Stock Projectiles, Hollow Shafting, Shells for Carbonic Acid and other Gases, Piston and Valve Rods, Axles, Bolts and Columns, Working Barrels, Roller Bearings, Bushings, Couplings, Boiler Tubes and other purposes where

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Henry L. Coe,
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Kellogg Weldless Tube Co.,
New York City.
M. T. Miles & Son,
317 and 318 Western Union Bldg., Chicago.
C. R. Talbot & Co.,
9 and 10 Wiggins Blk., Cincinnati.

Christian Endeavor Washington Excursions.

Low rate tickets to Washington account Christian Endeavor Convention will be sold via Pennsylvania Short Lines July 4, 5, 6 and 7; good to return until July 15, with privilege to extend limit until July 31. See Pennsylvania Line Ticket Agents for details.

A NEW car wheel plant at Birmingham, Ala., has been completed and is operated by the Decatur Car Wheel & Mfg. Co. The company also owns a car wheel plant at New Decatur idle for the present. The new works have a daily capacity of 500 car wheels.

Christian Endeavor Washington Excursion.

Low rate tickets will be sold to Washington, account Christian Endeavor convention, via Pennsylvania Short Lines, July 4th, 5th, 6th and 7th; good to return until July 15th, with privilege to extend limit until July 31st. See for details, Mr. C. L. Kimball, Ass't Gen. Pass. Agt., Cleveland, Ohio.

THERE has been formed through Philadelphia enterprise a syndicate of American capitalists for the purpose of erecting a large locomotive works in Nijni Novgorod, Russia. Contracts for $500,000 worth of machinery have already been awarded, mainly to Philadelphia firms. Edmund D. Smith, of Philadelphia, is now in Russia arranging the plans, and Walter F. Dixon, an experienced engineer, has recently returned from the same country. The works will be built by the Russian-American Mfg. Co. in connection with a Russian plant already established at Nijni Novgorod, which manufactures cars, steamboats, boilers, engines, etc., and now employs 5,000 hands. Engineer Dixon is to have entire charge of the locomotive works, which will be capable of turning out 200 engines a year. It is understood that the Czar's government has given valuable encouragement to the enterprise. As nearly 85 per cent. of the railways in the empire are operated by the government the new company will, of course, be obliged to look to it for the greatest share of its contracts, and these, it is understood, have already been assured.—[Bulletin.

Democratic National Convention Excursions to Chicago.

Tickets to Chicago will be sold at reduced rates via Pennsylvania Lines July 3, 4, 5 and 6; good returning until July 12; details may be obtained by applying to Ticket Agents of Pennsylvania Lines.

THE commissioners appointed to adjust the damages accruing to the Wheeling Steel & Iron Co., Wheeling, W. Va., for the right of way through its property sought by the Wheeling Bridge & Terminal Co., at Benwood, awarded the concern $67,500, their claim being $250,000.

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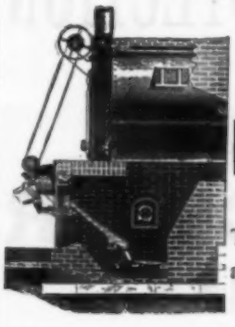
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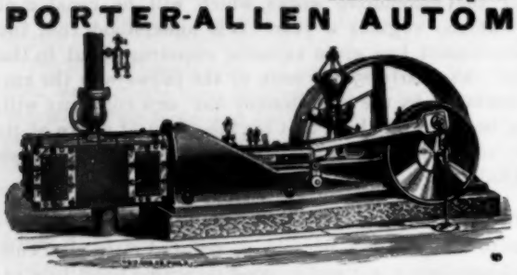

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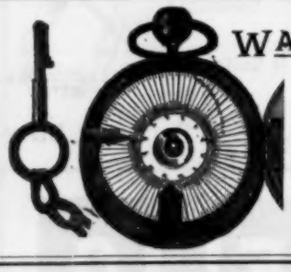

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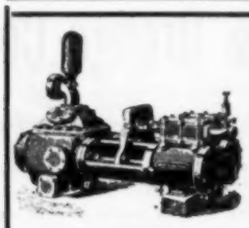

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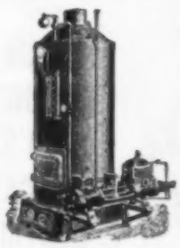

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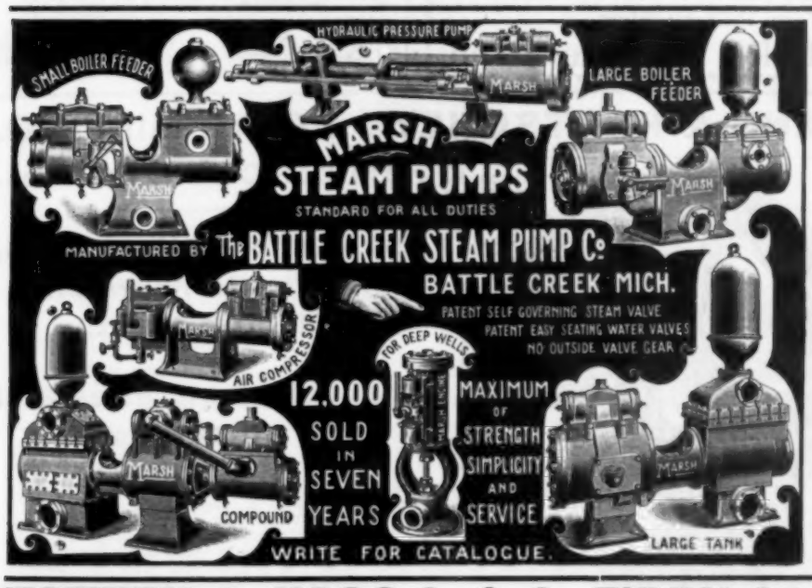

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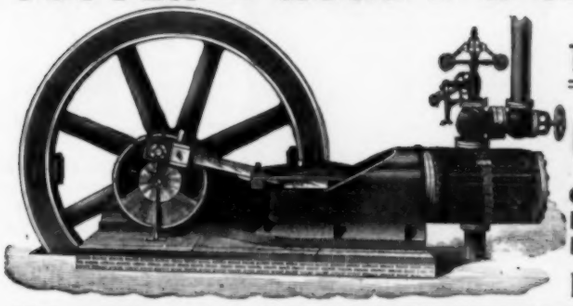

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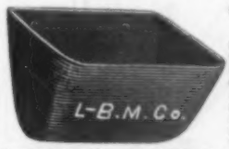

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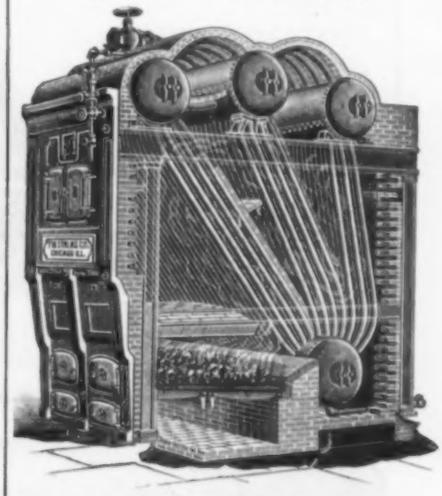

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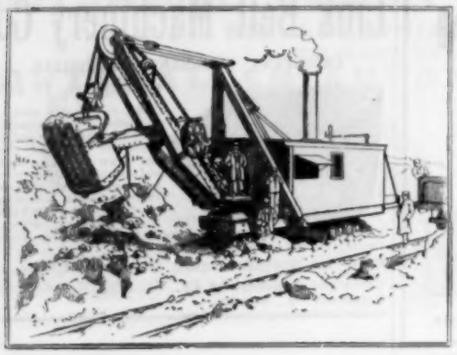

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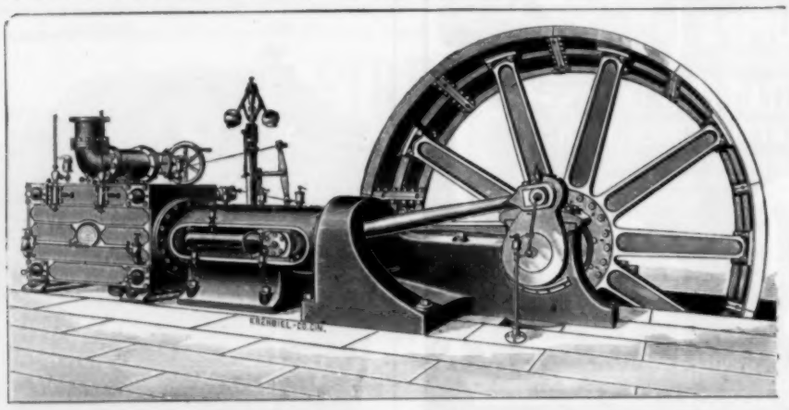

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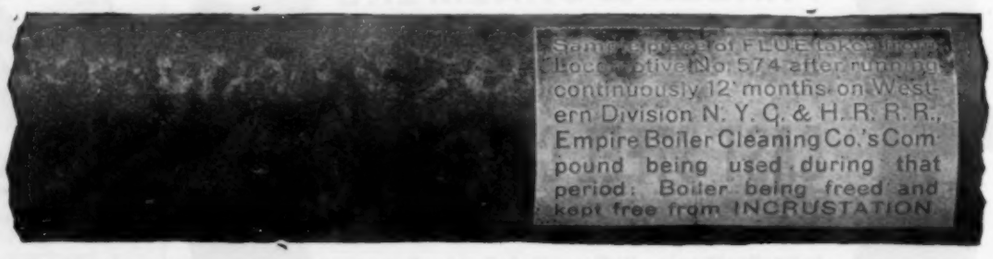
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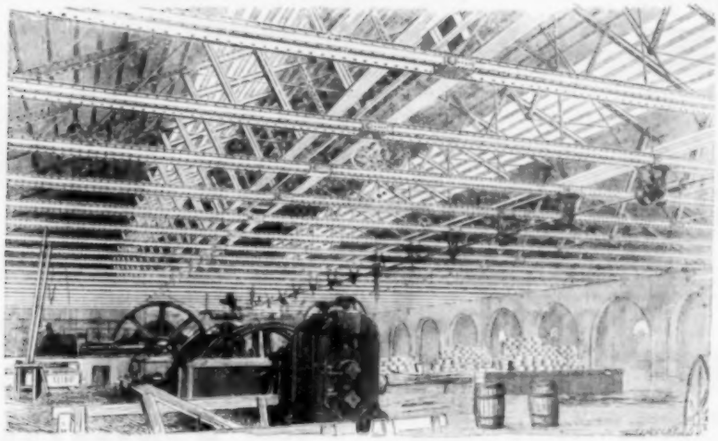

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Bringing down to Jan. 1, 1896, a description of these works. There is also a

COMPLETE DIRECTORY

to other industries which are large consumers of Iron and Steel. A new feature is a complete list of **MALLEABLE IRON WORKS.** There is also a list, brought down to 1896, of Plate and Sheet Mills and of Tin Plate Works in the United States. Making a complete Directory of

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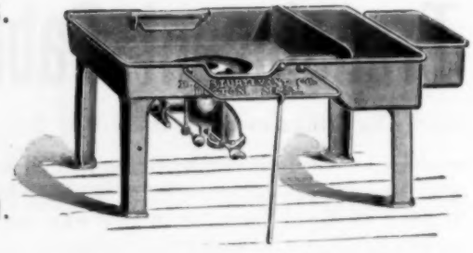

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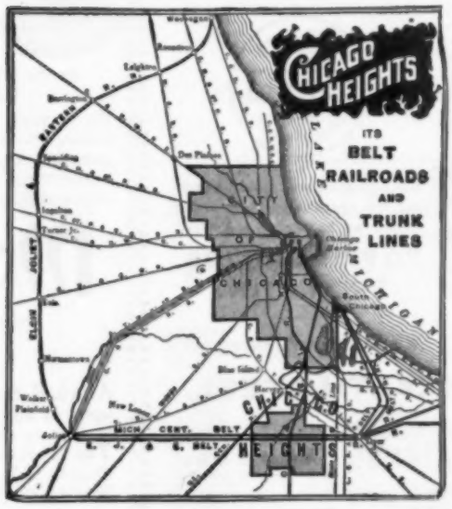

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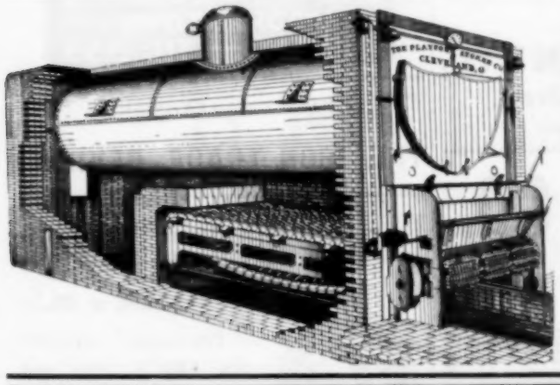

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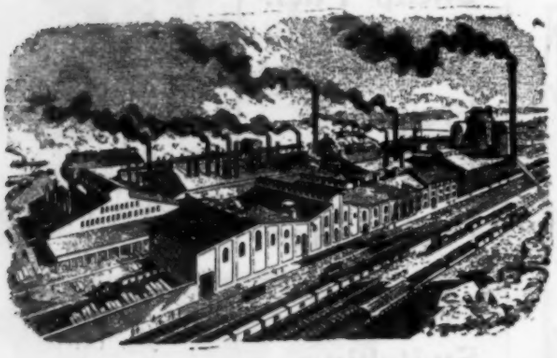

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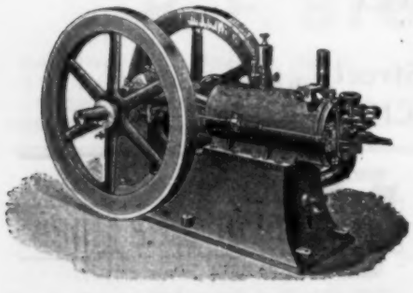

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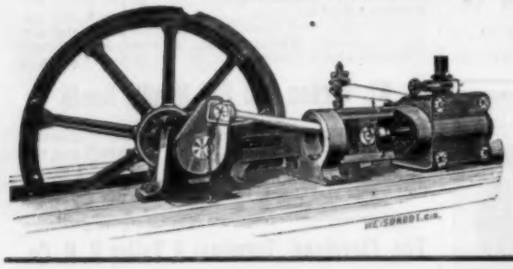

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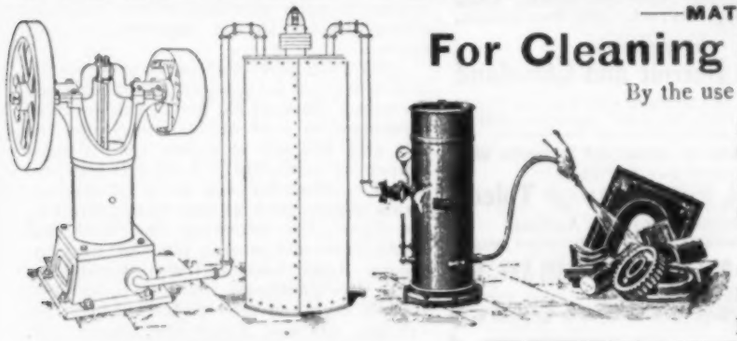

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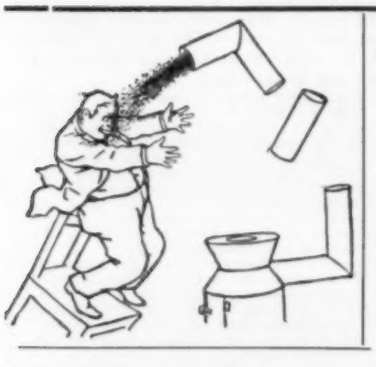

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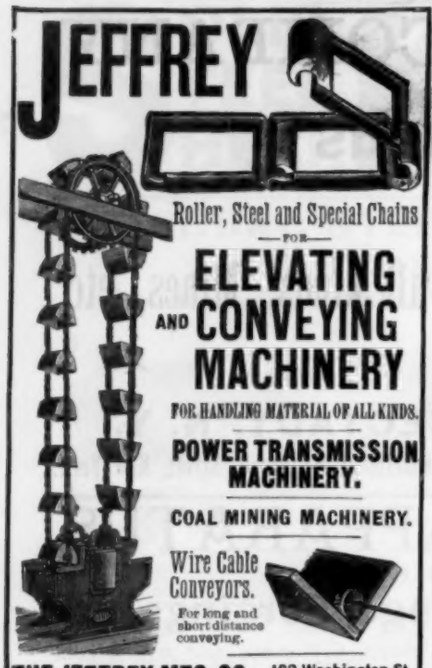

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Whereas under and by virtue of an order of sale made by the Circuit Court for the county of Marquette, in Chancery, on the 12th day of March, A. D., 1896, in the cause then pending in said court wherein the Anthony Powder Company (Limited) is complainant and the Escanaba River Land & Iron Company is defendant, the receiver of all and singular the property of said Escanaba River Land & Iron Company theretofore appointed by said court to have and receive all the property of said company and abide the further order of said court was duly authorized and empowered to sell the mine, mine plant and real estate of said company situated in the township of Forsyth, in the county of Marquette and State of Michigan, on certain terms and conditions in said order set forth for the purpose of paying the debts of said corporation mentioned in said order together with the costs and expenses of such sale and of the said receiver subject to the approval of said court.

NOW THEREFORE, in pursuance with said order and for the purpose mentioned therein, I, Thomas M. Wells, the receiver mentioned in said order, hereby offer for sale, and will sell at public vendue upon proper and sufficient bid or bids received therefor, either for cash or on satisfactory terms of sale, such as may be approved by the Court, the following described real estate, mine and mining plant of said Escanaba River Land & Iron Company, to-wit: The southeast fractional quarter of section eighteen (18) in township forty-five (45), north of Range twenty-five (25), west in the county of Marquette and State of Michigan, the same being the Swanzy Mine, so-called, together with the machinery, boilers, pumps, engines and all connections, pipes, fixings, fixtures and appurtenances and all tracks, tools, appliances and structures of every kind constituting the mine plant located on said above described land; also all materials and supplies on hand consisting of fuel and other property required for use in operating the mine which maybe on hand at the time of said sale, said materials or supplies to be sold as such as personal property on the premises, but said mining machinery, pumps and engines and all other property constituting the plant for operating the mine on the premises to be sold as part and parcel thereof in one lump with the land above described, such sale or offer of sale to take place and be made at the front door of the court house in the city of Marquette, in said county and State, on Friday, the twenty-fourth day of July, 1896, at twelve (12) o'clock noon of said day. The sale of said material and supplies being personal property, shall take place on the premises at the mine location of said Escanaba River Land & Iron Company, in the township of Forsyth, Marquette County, Michigan, on Saturday, the twenty-fifth day of July, A. D., 1896, at the hour of twelve (12) o'clock noon of said day.

The mining plant aforesaid consists of the following: Two 5 ft. by 16 ft. boilers; one 10 x 16 duplex hoisting engine; two four-foot hoisting drums; one air compreseor; three power drills; one No. 10 Cameron pump, two No. 7 Knowles pumps; two 1 and 1½ ton skips; together with all connections, pipes, fittings, wire rope, and all shaft houses, buildings, dwellings, and all structures of every kind and description, and all other property of every kind constituting the mining plant on said premises.

Specifications and descriptions of the materials and supplies on hand at the time of such sale will be furnished bidders for inspection at the front door of the court house in the city of Marquette at twelve (12) o'clock noon on the twenty-fourth day of July, A. D., 1896, at the time of offer of sale of said mine and plant.

The receiver at such sale reserves the right to require a deposit of five thousand dollars to be made by the successful bidder at the time of such sale to remain on deposit with said receiver pending the final confirmation of such sale by the Court, the same to apply on the purchase price in case of confirmation of sale and to be returned to the bidder in case of rejection of said bid.

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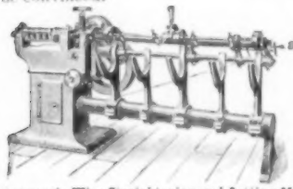

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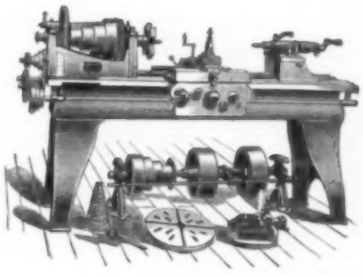

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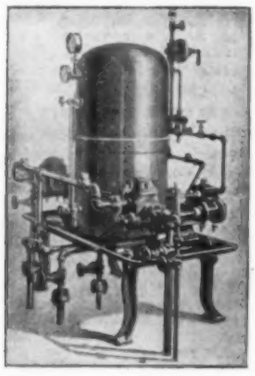

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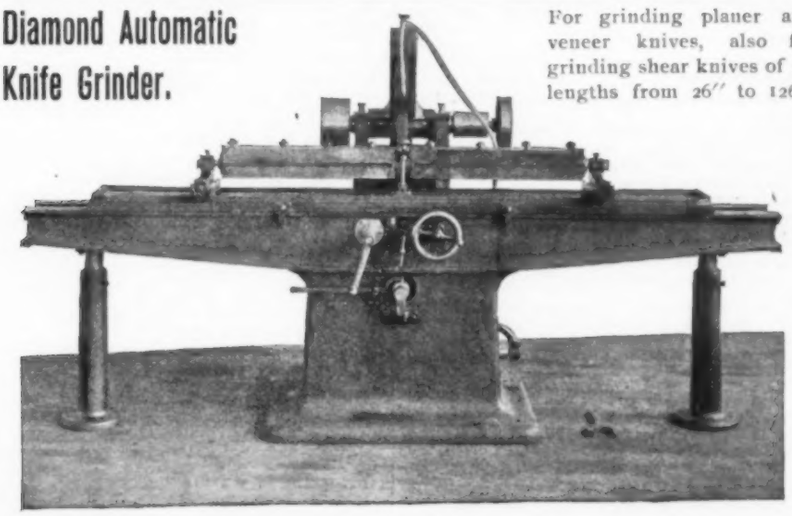

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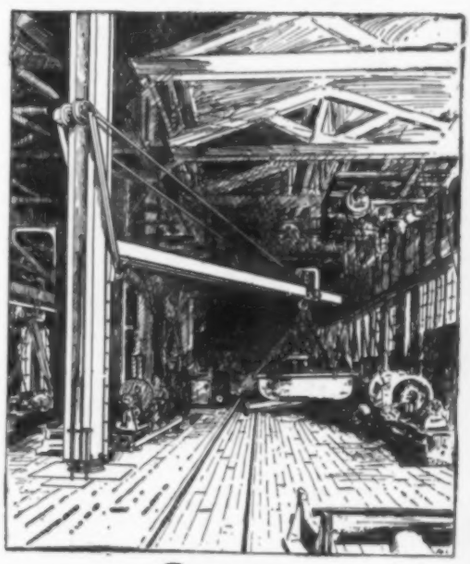

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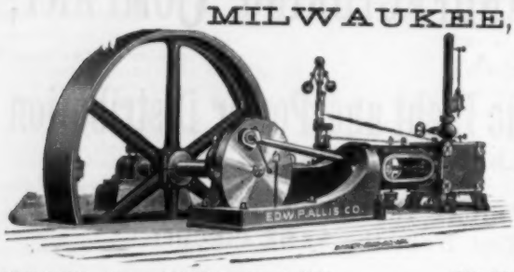

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	PAGE
Adt & Son, John	31
†Addyston Pipe & Steel Co	31
Ætna-Standard Iron & Steel Co	36
Aitchison, Rob't Perforated Metal Co	35
Allis & Co., Edward P	34
American Blower Co	21
American Fire Brick & Clay Co	18
American Smokeless Furnace Co	18
Armstrong Bros. Tool Co	1
Atlanta Steel & Tin Plate Co	2
Atwood & M'Caffrey	19
Bacon, Earle C	21
Baird Machinery Co	19
Battle Creek Steam Pump Co	23
Berlin Iron Bridge Co	25
Besly & Co., C. H	40
Bethlehem Iron Co	39
*Berger Mfg. Co	—
*Bertsch & Co	—
Bickford, H	40
Bourne-Fuller Co	22
Brightman Furnace Co	21
Brown, Edward	39
Brown Hoisting & Conveying Machine Co	27
Bucyrus Steam Shovel & Dredge Co	24
Buffalo Forge Co	1
Cady Mfg. Co	35
Cambria Iron Co	37
Central Iron & Steel Co	39
Chicago Heights Land Ass'n	27
†Chicago & Northwestern Ry	26
Channon & Co., H	40
Church, Isaac	39
Cincinnati Corrugating Co	2
Claflen Mfg. Co	39
Clearfield Fire Brick Co	39
Cleveland & Buffalo Transit Co	22
Cleveland City Forge & Iron Co	1
Cleveland Electrotype Co	28
*Cleveland Galvanizing Works	—
Cleveland Rolling Mill Co	39
Clinton Iron & Steel Co	21
*Clonbrock Steam Boiler Co	—
Coffman Coke Co., W. H	36
*C. M. & St. P. Ry	—
Cole, J. Wendell	40
Collins & Co., H. E	1
Dangler Stove & Mfg. Co	28
*Davis & Egan Machine Co	31
Deming Co	23
Detroit & Cleveland Steam Navigation Co	30
*Diamond Machine Co	31
Dickman & MacKenzie	2
Dixon, Jos. Crucible Co	19
Dover Fire Brick Co	39
East Chicago Foundry Co	18
Emmerton, F. A	2
Empire Boiler Cleaning Co	24
Enterprise Boiler Co	40
Finished Steel Co	21
*Fix Sons	—
Fleharty, J. H. & Co	24
Forster, Waterbury & Co	1
Fraser & Chalmers	23
*Freeman & Sons, S	—
*Fulton Steam Boiler Wks. & Fdy. Co	—
General Electric Co	29
Garden City Foundry Co	36
†Garden City Sand Co	19
Gerlach, Peter & Co	22
Gobeille Pattern Co	24
*Goetze, Otto	—
*Greenfield, W. G. & G	—
*Haeseler & Co	—
Hamilton Foundry & Machine Co	1
Harrington & King Perforating Co	38
Harrington, Son & Co., Edwin	25
Harrison Safety Boiler Works	17
Hartford Steam Boiler Insp. & Ins. Co	23
Hazelton Boiler Co	22
Hooven, Owens & Rentschler Co	24
Hunt & Co., Robert W	2
Illinois Central R. R	38
Illinois Screw Co	1
Indiana Bicycle Co	37
International Correspondence School	19
Iron Clad Paint Co	35
Jeffrey Mfg. Co	30
Jenkins Bros	36
Jessop & Sons, Ltd., Wm	31
Jones Foundry Co., W. A	1
Johnson Co., The	36
Junction Iron & Steel Co	2
Kellogg Weldless Tube Co	20
†Kelly & Co	29
Lane & Bodley	28
Link Belt Machinery Co	23
Lloyd Booth Co	38
*Lodge & Shipley Machine Tool Co	—
Lorain Foundry Co	1
Marine Iron Works	21
Marion Steam Shovel Co	39
McDowell Steel Co	39
McEwen Mfg. Co	30
Michigan Mining School	24
Mitchill, Cornelius S	27
Monarch Cycle Mfg. Co	28
Morton Tin Plate Co	22
Moyes, L. M	37
*Nanz & Co	22
National Jeloluse Co	28
Newell Bros	1
†Newport Sand Bank Co	22
Norman Co., J. J	28
North American Metaline Co	40
Oglebay, Norton & Co	22
Ohio Sand Co	40
Otto Gas Engine Co	35
Pittman, C. K	2
Pittsburg Steel & Iron Mfg. Co	28
Pollock, Wm. B. & Co	2
Playford Stoker Co	27
Pope, E. C	22
Prentiss Tool & Supply Co	31
Q. & C. Co	40
Rand Drill Co	2
Rippel Mfg. Co	1
Reese, Hammond & Co	40
Roberts Steel Chain Belting Co	36
Rockwell & Co., W. S	31
Salem Wire Nail Co	38
Semet-Solvay Co	30
‡Sharon Fire Brick Works	1
Sharpless & Winchell	40
Shiffler Bridge Co	37
Skinner Chuck Co	40
Southwark Foundry & Machine Co	22
Springfield Machine Tool Co	40
Standard Paint Co	39
Star Dynamo Co	35
Starrett Co	1
Sterling Emery Wheel Mfg. Co	38
Stirling Co	23
Stevens, F. B	29-40
Stilwell-Bierce & Smith-Vaile Co	2
Stowe, Fuller & Co	18
Stuart Fire Brick Co	37
Sturtevant Co., B. F	2-26
Sykes Iron Roofing Co	39
Taylor & Boggis Foundry Co	1
Textor, O	2
Tod, Wm. & Co	38
Toledo Machine & Tool Co	39
Totten & Hogg I. & S. F'dry Co	23
Trethewey & Co	28
Translucent Fabric Co	25
Union Mining Co	18
Universal Telephone Co	1
Upson Nut Co	1-14
*Vulcan Iron Works, Toledo	—
Wickes Bros	2
†Ward & Nash	29
Westinghouse Electric & Mfg. Co	33
*Williams Mfg. Co	22
Westmoreland Fire Brick Co	35
Worthington, Henry R	23
Wright Co	31
Wellman Seaver Engineering Co	40
Young, J. D	21

IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

No. 1 Specular, Bessemer	$4.50@4.75
No. 1 Bessemer hematite	4.00@4.25
Hematites No. 1 non-Bessemer	2.25@2.65
No 1. Specular, non-Bessemer	2.75@3.15

PIG IRON.

CLEVELAND (f. o. b. cars):	
Bessemer	$12 40@12 60
No. 1 Strong Foundry	12 50@12 75
No. 2 Strong Foundry	11 75@12 25
No. 1 Gray Forge, red short	10 75@11 00
No. 2 Gray Forge, neutral	10 50
No. 1 American Scotch	12 75
No. 2 American Scotch	12 00@12 25
Lake Superior Charcoal	13 50
PITTSBURG:	
No. 1 Foundry	$12 25@12 50
No. 2 Foundry	11 75@12 00
Gray Forge	10 65@10 85
White and Mottled	10 25
Warm Blast Charcoal	15 00@16 00
Cold Blast Charcoal	22 00
Bessemer	12 40@12 60
CHICAGO:	
Lake Superior Charcoal	$13 50@$14 00
Local Coke Foundry No. 1	12 00@12 50
Local Coke Foundry No. 2	11 50@12 00
Local Coke Foundry No. 3	11 00@11 50
Local Scotch Foundry No. 1	12 00@12 50
Local Scotch Foundry No. 2	11 50@12 00
Local Scotch Foundry No. 3	11 00@11 50
Southern Coke No. 1	12 10@12 35
Southern Coke No. 2	11 60@11 85
Southern Coke No. 3	11 10@11 60
Southern No. 1 Soft	11 60@11 85
Southern No. 2 Soft	11 35@11 50
Southern Silveries No. 1	11 85@12 35
Southern Silveries No. 2	11 60@11 85
Jackson Co. Silveries	14 50@16 00
Ohio Silveries No. 1	15 00@15 50
Ohio Silveries No. 2	14 50@15 00
Ohio Strong Softeners	15 00@15 50
Alabama Car Wheel	16 85@17 35
Malleable Bessemer	13 00@13 50
Coke Bessemer	13 00@13 50
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$ @$11 00
Southern Coke No. 2 and No. 1 Soft	10 50
Hanging Rock Coke, No 1	12 50@13 50
Hanging Rock Charcoal No. 1, Fdy	16 00@17 00
Tennessee Charcoal No 1	13 00@14 00
Jackson County Silvery No 1	14 00@14 50
Southern Coke, Gray Forge	9 50
" " Mottled	9 50
Standard Alabama Car Wheel	15 00@16 00
Tennessee " "	14 00@15 00
Lake Superior " "	15 25@15 50
BUFFALO:	
No. 1 Foundry Strong Coke Iron Lake Superior Ore	$13 00@13 25
No. 2 Foundry Strong Coke Iron Lake Superior Ore	12 50@12 75
Ohio Strong Softener No. 1	13 00@13 50
Jackson Co. Silvery No. 1	15 25@15 50
Lake Superior Charcoal	13 50@14 00
Southern Soft No. 1	12 15
Hanging Rock Charcoal	17 00
ST. LOUIS (reported by Rogers, Brown & Meacham):	
Southern Coke No 1	$ @$11 50
Southern Coke No. 2	11 00
Southern Coke No. 3	10 50
Southern Gray Forge	10 00
Southern Charcoal No. 1	15 00
Missouri Charcoal No. 1	14 00@15 00
Ohio Softeners	16 00
Lake Superior Car Wheel	15 00
Southern Car Wheel	16 25

OLD RAILS AND SCRAP METAL.

	GROSS TONS
Old iron rails	$16 00
Old steel rails	12 25
Old car wheels	12 50
	NET TONS
No. 1 R. R. wrought scrap	$12 00
Mill scrap	10 00
No. 1 Machine cast scrap	9 50
Iron axles	16 50
Axle turnings	9 00
Wrought turnings (free from cast)	7 50
Cast borings	6 50
Uncut wrought iron boilers	4 00
Steel boiler plates	10 00
Grate bars	6 75
Pipes and flues (clean)	9 00
Tank iron	9 00
Hoop and band iron	7 00
Sheet iron	6 50
Wrought drillings	7 50
Malleable iron	10 00

STRUCTURAL MATERIAL.

Beams and Channels (Cleveland mill)	1.65c
Angles	1.34c@1.39c
Tees	1.50c
Universal Plates	1.40c
Sheared Plates	1.45c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 30
4¼ to 6 by ⅜ to 1 inch	1 35
1¾ to 6 by 1⅛ to 2 inch	1 35
1¾ & 1⅜ by ¾ to ¼ inch	1 30
1 & 1¼ by ¾ to ¼ inch	1 30
⅛, ¾, ⅞, by ¾ to ⅓ inch	1 30

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.
THE CADY MFG. CO.
18, 20 and 22 Johnson St., CLEVELAND, O.

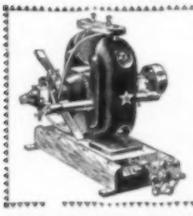
SEND FOR OUR NEW CATALOGUE OF Power Presses, Drop Hammers, Punches and Shears, Wire Working and Special Machinery.

PERFORATED METALS
OF ALL KINDS FOR
MILLING MINING AND AGRICULTURAL MACHINERY,
PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.
LARGE AND VARIED ASSORTMENT OF SIZES. CORRESPONDENCE SOLICITED.
THE ROBERT AITCHISON. PERFORATED METAL CO.,
OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.

A. H. LEITCH, PREST. JOHN C. LEITCH, SEC. AND TREAS.

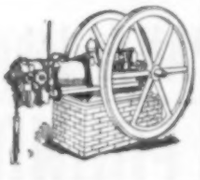
WESTMORELAND FIRE BRICK CO.
HIGH GRADE FIRE BRICKS.
PITTSBURG, PA.
Works and Mines, Westmoreland, Pa.

Subscribe for the Iron Trade Review, $3 per year.



SMALL DYNAMOS
For Incandescent Lighting,
In Factories, Mills, etc., at a Reasonable Price.
If you have power put in your own lighting plant. Write for our Catalogue.
STAR DYNAMO CO., Jefferson City, Mo.

POWER From **GAS OR GASOLINE.**
No Steam, Coal, Ash, Gauges, Engineer nor Danger.
From 1 to 250 horse-power. } **Can be Used in City or Country.**
THE OTTO GAS ENGINE WORKS, Inc.
33d and Walnut Sts., PHILADELPHIA, PA.
S. M. York, 42 S. Water St., Cleveland Agent. Over 45,000 Sold.



IRON CLAD PAINT CO.
Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g.
CLEVELAND OHIO.

Trade Mark Patented.

ORDER DIRECT FROM THE **Iron Clad Paint Co.**

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.

Round and Square.

1 to 1⅞ inch	1 10
2 to 2⅞ inch	1 30
2¾ to 3¼ inch	1 25
3⅜ to 4 inch	1 60
4⅛ to 4⅝ inch	2 20
4⅜ to 5 inch	2 40

Oval.

⅜ to 1¾ inch	1 30
⅜ to ¾ inch	1 30
⅛	1 50
⅜	1 70

Half Oval and Half Round.

1¼ to 5 inch	1 65
⅜ to 1¼ inch	1 45
⅜ to ¾ inch	1 70
⅛	1 85
⅜	2 90

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 20
1 to 1¾ by ¼ and 5-16 inch	1 25
¾ to ⅞ by ¼ and 5-16 inch	1 35
½ to ⅝ by ¼ and 5-16 inch	1 60

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 35
1 7-16 to 2, No. 17, 18 and 19	1 40
1 7-16 to 2, No. 20	1 50
1 7-16 to 2, No. 21	1 60
1 7-16 to 2, No. 22	1 70
1⅛ to 1⅜, No. 13, 14 and 15	1 40
1⅛ to 1⅜, No. 16, 17 and 18	1 45
1⅛ to 1⅜, No 19 and 20	1 50
1⅛ to 1⅜, No. 21	1 60
1⅛ to 1⅜, No. 22	1 70
15-16 and 1 inch, No. 13, 14 and 15	1 35
15-16 and 1 inch, No. 16, 17 and 18	1 50
15-16 and 1 inch, No. 19 and 20	1 60
15-16 and 1 inch, No. 21	1 70
15-16 and 1 inch, No. 22	1 80
⅝, No. 13, 14 and 15	1 60
⅝, No. 16, 17 and 18	1 70
⅝, No. 19 and 20	1 80
⅝, No. 21	1 90
⅝, No. 22	2 00
13-16, No. 13, 14 and 15	1 70
13-16, No. 16, 17 and 18	1 80
13-16, No. 19 and 20	1 90
13-16, No. 21	2 00
13-16, No. 22	2 10
¾, No. 13, 14 and 15	1 80
¾, No. 16, 17 and 18	1 95
¾, No. 19 and 20	2 05
¾, No. 21	2 15
¾, No. 22	2 25
11-16, No. 13, 14 and 15	2 05
11-16, No. 16, 17 and 18	2 10
11-16, No. 19 and 20	2 20
11-16, No. 21	2 30
11-16, No. 22	2 40
11-16, No. 23	2 50
⅝, No. 13, and 15	2 10
⅝, No. 16, 17 and 18	2 20
⅝, No. 19 and 20	2 30
⅝, No. 21	2 40
⅝, No. 22	2 50
⅝, No. 23	2 60
9-16, No. 13, 14 and 15	2 30
9-16, No. 16, 17 and 18	2 40
9-16, No. and 20	3 50
9-16, No. and	1 60
9-16, No. 221	2 70
9-16, No. 22	1 80
7-16 and ½ inch, No. 13, 14 and 15	3 50
7-16 and ½ inch, No. 16, 17 and 18	2 60
7-16 and ½ inch, No. 19 and 20	2 70
7-16 and ½ inch, No. 21	2 80
7-16 and ½ inch, No. 22	2 90
7-16 and ½ inch, No. 23	3 00
½, No. 13, 14 and 15	3 00
½, No. 16, 17 and 18	3 10
½, No. 19 and 20	3 20
½, No. 21	4 50
½, No. 22	3 60
½, No. 23	3 75

Light Band.

1⅛ to 6 by ⅛ to 3-16 inch	1 60
1⅛ to 6 by Nos. 11 and 12	1 65
1 to 1¾ by ⅛ to 3-16 inch	1 65
1 to 1¾ by Nos. 11 and 12	1
⅛ and 13-16 by ⅛ to 3-16 inch	1
⅛ and 13-16 by Nos. 11 and 12	1 75
¾ and 11-16 by ⅛ to 3-16 inch	1 90
¾ and 11-16 by Nos. 11 and 12	1 95
⅝ and 9-16 by ⅛ to 3-16 inch	2 05
⅝ and 9-16 by Nos. 11 and 12	2 10
½ by ⅜ to 3-16 inch	2 20
½ by Nos. 11 and 12	2 25

Wagon Box Iron.

⅛ inch, beveled edge, by Nos. 11 and 12	1 50
⅛ inch, " " " " 13 and 14	1 60
⅛ inch, " " " " 11 and 12	1 65
⅛ inch, " " " " 13 and 14	1 75

Sheet Iron.

No. 10	1 45
No. 12	1 55
No. 14	1 65
No. 15-17	1 75
No. 18	1 90
No. 20	2 05
No. 22-24	2 15
No. 25-26	2 25
No. 27	2 35

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 45
Shell	1 60
Flange	1 70
Marine Flange	2 00
Fire Box	2 50

Above includes plates 90 inches wide.

90 to 96 in. wide	⅛c. lb. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1⅛c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs.
1 to 2 in, inclusive	08
9-16 to ⅞ in. "	08

Soft Steel Bars, Light

LOW PRICES

do not always influence business. Some brands of goods are undesirable as a **Gift.**

Write us for our catalogue and send us a sample order and see if there is not **Economy** in using **First Quality** goods at Fair Prices.

Structural Shapes, Rails.

TIN PLATES,
GALVANIZED SHEETS,
CORRUGATED IRON,
BLACK PLATES,

Sheet Iron and Steel, any finish, patent leveled or common.

Aetna Standard Iron & Steel Co.,
BRIDGEPORT, OHIO.

ROBERTS STEEL CHAIN BELTING CO., Pittsburg, Pa.

Elevating and Conveying Machinery

For Handling all kinds of materials.

Special Wrought and Steel Chains of every description; Coil and Cable Chains; Chain Haulages for Coal Mines; Sprocket Wheels; Complete Coal and Ashes Handling Plants; Wire Rope Haulages and Wire Rope.

W. H. COFFMAN COKE CO.

BLUEFIELD, W. VA.

GENERAL FACTORS AND SHIPPERS OF

POCAHONTAS FLAT-TOP COKE.

So low in ash that it requires no fluxing for foundry purposes. Our foundry and furnace coke was awarded the first premium at the World's Fair in 1893.

AVERAGE ANALYSIS OF COKE.

Moisture	00.196	Sulphur	00.677
Fixed Carbon	93.625	Ash	05.004
Volatile Matter	00.494		

Foundry, Furnace and all sizes of crushed coke. Guaranteed lower in Sulphur than any other commercial coke

STEEL CASTINGS

FROM 10 LBS. UPWARD.

Made from Best Open-Hearth Steel.

ALSO SAND ROLLS AND CAST-IRON PINIONS.

SEND FOR ESTIMATES.

THE JOHNSON COMPANY, Johnstown, Pa.

GARDEN CITY FOUNDRY CO.

INCORPORATED.

Successors to TURNER, DICKINSON & CO.

Armitage and Central Avenues, Station G, Chicago, Ill.

FRICTION CLUTCHES, HANGERS, PILLOW BLOCKS & PULLEYS.

Large Stocks on Hand. Shipments Promptly Made.

We Claim The Following Merits for Jenkins Bros.' Valves

1. Manufactured of the best Steam Metal.
2. No regrinding, therefore not constantly wearing out the Seat of the Valves.
3. Contain JENKINS DISC, which is suitable for all Pressures of Steam, Oil and Acids.
4. The Easiest Repaired, and all parts Interchangeable.
5. Every Valve Tested before leaving the factory.
6. ALL GENUINE stamped with Trade Mark.

(2)

JENKINS BROTHERS, NEW YORK, PHILADELPHIA, CHICAGO, BOSTON

7-16 to ½ and 2¾ to 3 in.	.09
3⅛ to 4 in.	.09½
⅝ to 11-16 and 4½	.10
⅝ to 6 in.	.10½
¼ to 9-32 and 6¼ to 7 in.	.11
[illegible] in	.13

Flats.

	cts. lbs
¼ to 9-16 in. wide by 2 to ½ thick	.8

Bessemer and O. H. Steel.

Bessemer Machinery	base price,	1 50
Open-hearth Tire	"	1 50
Open-hearth Spring	"	1 70
Sleigh Shoe	"	1 55
Toe Calk	"	1 65
Cutter Shoes, tapered and bent	"	1 70

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 30
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 00

Wrought Pipe and Boiler Tubes.

Lap weld black, base	dis. 65
Butt " " "	dis.
Lap " galv. "	dis. 52½
Butt " " "	dis. 50
Boiler tubes 2¼" and smaller	dis 62½
Boiler tubes 2½" and larger	dis. 65
Casing screw and socket joint	dis. 52½
Casing inserted joint	dis. 47½

MACHINERY SUPPLY MARKET.

Anvils.

American	₩ lb 9@10
Wright's	₩ lb 12

Bellows.

Blacksmiths'	Hill's	dis 40
	Bullock's	dis 50&10
Moulders'		dis 40@40&10
Hand		dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70 & 10
" " " extra	dis 60&10
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 50
Shultz Raw Hide Leather Belting, single	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 4[illegible]
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis
Horton's Universal	dis
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 30

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis
" " Gear Cutters	dis

Crowbars.

Cast Steel	₩ lb 3½
Iron, steel points	₩ lb 3

Drill and Drill Sockets.

Twist Drills	dis 60&10
Morse Taper and Straight Shank to 1¼"	dis 60&10
Morse Taper and Straight Shank Larger than 1¼"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 60@60&5
Cleveland " "	dis 60@60&5

SHIFFLER BRIDGE COMPANY,

BUILDING DEPARTMENT.

SPECIALTIES: STEEL AND IRON BUILDINGS FOR ROLLING-MILLS TIN PLATE PLANTS, STEEL WORKS, FOUNDRIES, FACTORIES, ROOF TRUSSES, GIRDERS, COLUMNS, BEAMS, CORRUGATED IRON, ETC.

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Branch Offices:
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65 Dexter Building, Chicago, Ill.
228 Lumber Exchange, Minneapolis, Minn.

CAMBRIA STEEL.

Steel Rails, Blooms, Billets, Bars, Axles, Angles, Channels, Forgings, Locomotive Car and Structural Steel.

CAMBRIA IRON COMPANY, S. W. Cor. 15th and Market Sts., opp. Penna. R. R. Station, Philadelphia; Chicago office, Western Union Building; New York office, (for Rails and Axles), 33 Wall St.; Cleveland office, Bourne, Fuller & Co. Works at Johnstown, Pa.

GAUTIER STEEL DEPARTMENT OF CAMBRIA IRON CO.,

JOHNSTOWN, PA.

MERCHANT BAR STEEL: Including Tire, Toe Calk, Machinery, Carriage Spring, Railroad Spring, Hoe, Rake, Fork, etc.
AGRICULTURAL STEEL AND SHAPES: Finger Bars, Knife Backs, Rake Teeth, Bundle Carrier Teeth, Tedder Forks and Springs, Spring Harrow Teeth, Harrow (Drag) Teeth, Seat Springs, etc.
PLOW STEEL: Flat and Finished Plow Shapes, Digger Blades, Slabs (Penn and Perrot), Hammered Lay, Rolled Lay, etc.

Cold Rolled Steel Shafting. **Steel Harrow Discs.** **Cambria Link Barb Wire.**

New York Office, 102 Chambers St. | Philadelphia Office, 611 Phila. Bourse. | Chicago Office, 209 Western Union Bldg. | Atlanta Office, 325 Decatur st.

STUART FIRE BRICK CO.
MANUFACTURERS[OF]
Silica Brick
For Open-Hearth, Basic and Acid Steel Furnaces, Glass and Copper Tank Furnaces. Extra Shapes MADE TO ORDER.
Office, Room 21, Conestoga Bldg., Cor. Wood and Water Sts., PITTSBURG, PA.

COMBINE SAFETY WATER TUBE BOILER
L. M. MOYES, MANUFACTURER, PHILADELPHIA, PA.

Are built in the largest and best equipped factory in the World,

Experienced dealers recognize the importance of handling a standard line of wheels, something that has an established reputation and that everybody knows. It is uphill work trying to sell unknown wheels. It is no work at all to sell the Waverleys. Only dealers who handle them know how easily they are sold. You can make more money with less labor selling Waverleys than any other bicycle,

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	No. 4 to No. 54 46 gr.	150 gr.	Flour, C. F. F. FF.
Kegs, 50 lb	4½c	5 c	2½c
½ kegs 25 lb	4¾c	5¼c	2¾c
¼ kegs 12½ lb	5 c	5½c	3 c
10 lb cans, 10 in case	6 c	6½c	5 c
10 lb cans less than 10	10 c	10 c	7½c

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Hamden ..... dis 60&10@75
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Nicholson ..... dis 60&10@60&10&10
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Kearney & Foot ..... dis 60&10@60&10&10
Black Diamond ..... dis 60&10@60&10&10
McClellan ..... dis 60&10@60&10&10
Disston's ..... dis 65@70
Western ..... dis 70
Stub's ..... dis 25
Grobet's ..... dis 30
Reynolds Bros.' Hand Cut ..... dis 50
Industry File Works Hand Cut ..... dis 50

Hammers.

P. S. W ..... dis 40
Atha new list, Jan. 15, 1887 ..... dis 50
Heavy hammers and sledges under 5 lbs. 12c
" " " " over 5 lbs. 10c

Jack Screws.

Illinois Bolt Co. list ..... dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5⅝	4¾	4	3⅜	3⅛
Hexagon	15⅝	11⅝	8⅝	6	5⅜	5¼	
Washers	9	8	7	5	4⅝	4¼	4⅛

In lots less than 100 lbs, 50 lb add ½c., 1 lb boxes add 1c to list.

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Standard Penny Nails, 50 keg card rate
Car lots $2.55
Less than car lots $2.65

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Zinc and Tin ..... dis 60
Brass and Copper ..... dis 50
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Iron Pulleys, Walker List ..... dis 50
Medart Pulleys ..... dis 50
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Moore's Anti-Friction Differential Chain Pulley Block ..... dis 20

Rivets.

Iron, Thousand, list November 1, 1894 ..... dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894 ..... dis 60@65
Copper ..... dis 50@50&10

Taps.

Cards, Hand and Nut to 2 in. ..... dis 50
Carpenters' " " " ..... dis 50
Morse " " " ..... dis 50
Pratt & Whitney " " new list ..... dis 10
Machine Screw Taps ..... dis 55
Pipe Taps to 2½ in. ..... dis 70
Stay Bolt Taps ..... dis 25
Stove Bolt Taps ..... dis 55
Pulley Taps ..... dis 40

Vises.

Solid Box ..... dis 60
Parker's ..... dis 20@25
Prentiss ..... dis 20
Stephen's ..... dis 25@30
Barrett's ..... dis 30
Miller's Falls ..... dis 40
Merrill's ..... dis 15@20
Howard ..... dis 35

Wire.

New List, Apr. 9, 1894

Brass ..... dis 40
Copper ..... dis 40
Bright and annealed, Nos. 0@18 ..... dis 70&10@75
" " Nos. 19@26 ..... dis 75@75&5
" " Nos. 27@36 ..... dis 75&10&5
Coppered Nos. 0 to 18, market list ..... dis 70@70&5
Galvanized Nos. 0 to 18 " " ..... dis 65&5
Tinned market Nos. 0 to 18 ..... dis 67½
Cast steel ..... dis 50
Tinned Broom Wire ..... dis 70&5@70&10
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Annealed Grape, Nos. 10 to 14 ..... dis 75
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Donohue's Engineers ..... dis 20&10
Lamson & Sessions Engineers ..... dis 65
Billings & Spencer's Drop Forged ..... dis 25
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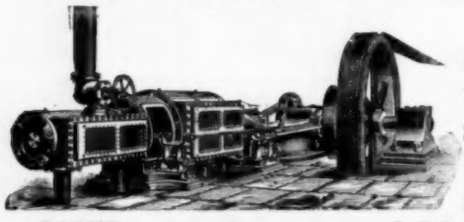

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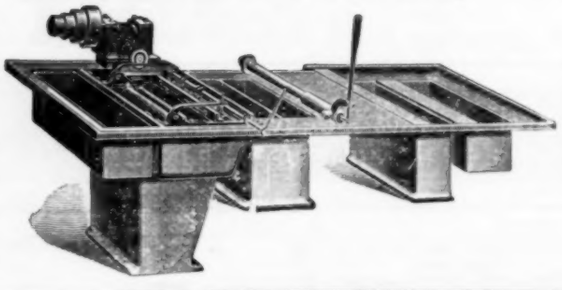

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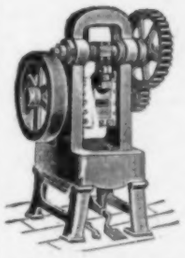

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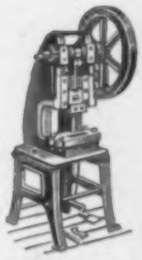

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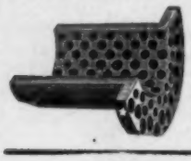

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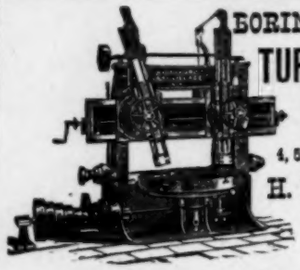

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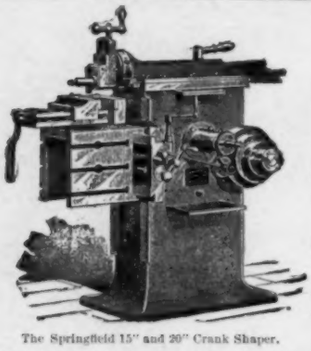

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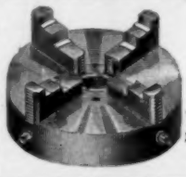

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